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No. XV. OF VOL. I., 1926. **No. 5354. Vol. CCX.** LONDON, SATURDAY, APRIL 10, 1926. Founded 1823. Registered as a Newspaper. Published Weekly. Pp. 120—**Price 1s.** Annual Subscription Inland £2 2s. Abroad £2 10s.

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BUT if we have been cavalier in our consideration of congenital defects and the anatomical strain which they impose upon these delicate structures, situate as they are at the very centre of the hydraulics of the circulation, may we not also have been somewhat cavalier in regard to strain of a functional kind? It has been the custom of late years to minimise the factor of physical and emotional stress in general in cardiovascular disease, and therefore it has been largely discounted in the production of endocardial changes. This is a material age, and we have become accustomed to discount functional elements in the ætiology of organic disease. We have been told that the healthy heart cannot be damaged by volitional effort. But whose heart is "healthy"? If a heart is found to be damaged after effort, then the onus of the damage is laid at the door of toxic agencies. But are we not all of us potentially, if not actually, "toxic"? And if this be so, does the doctrine of the heart's immunity from self-imposed strain carry any more practical application than that it is desirable, in order to reduce the effect of the strain to a minimum, that we should see to it that we are as little "toxic" as possible?

It is necessary to distinguish between sudden and occasional strain on the one hand and prolonged strain on the other. There seems good reasons for believing that both physical and emotional strain, if prolonged, may lead to endocardial disease, both of the sclerosing variety and, with or without this, of the active bacterial type. Since prolonged strain is inseparable from fatigue, this element may also be included in this group of ætiological factors.

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> "The disease occurs in individuals of fine health and physique who have had little or no previous illness. The majority of those suffering from it have undergone a considerable degree of physical stress—e.g., those who were serving in the fighting line in the years 1916–17. The infection is primary in the endocardium. The post-mortem appearances show no evidence of previous rheumatic endocarditis."

Carey Coombs in his equally important paper is led to almost identical conclusions. He says, as the result of his analysis of 30 cases of post-war chronic endocarditis of the bacterial type—

> "The predisposition of the ex-soldier to endocarditis lenta is not due to infections of the heart prior to enlistment, since approximately four-fifths of the cases, even after the Ministry of Pensions had scrutinised their histories, failed to disclose any evidence of such infections. . . . The facts as to lesions and diseases contracted during service are, of course, open to the criticism that it is quite impossible to assess in figures the liability to injury of the various 'portals of entry' of infection; but it does seem reasonable to conclude that the reason why soldiers have become victims of endocardial infection does not lie in their liability to be invaded by micro-organisms through any particular tract. . . . There is, however, a very remarkable fact, only imperfectly presented by the statements, that 80 per cent. of the men were engaged in the more strenuous forms of military service and that the average duration of service was 3·05 years, or nearly three-fourths of the whole length of the war. The fact is one which is not susceptible of arithmetical statement. It is this, that almost without exception the men whose military service was followed by the development of endocarditis lenta were men of fine physique and morale; men who joined the army early, served with all their might, and exerted themselves to the utmost limit of their physical powers. . . . Looked at from the obverse side, the same fact is equally striking. At the bases and elsewhere, both at home and overseas, there were large numbers of men of indifferent physique serving in the army; yet I have not so far encountered a single example of chronic endocardial infection amongst such men."

Carey Coombs does not miss the obvious point that excessive fatigue may predispose the body to infection, and thinks a biochemical link between fatigue and infection may be suggested by Walker Hall's work on the effect of dilute acids in accelerating blood cultures in nutrient broths.

Strain and fatigue overlap with *arterio-sclerosis*, with which in most cases *hyperpiesia* goes hand in hand. Upon this factor in the production of chronic endocardial disease I do not propose to dwell.

I agree with Irving Simons, to whom we owe a masterly critical review of the whole subject of endocardial infections up to the year 1914, that the lesions occurring in the heart in cases of the so-called *cachexias* lack clinical significance, and are to be regarded rather as marantic thromboses than as true endocarditic manifestations. This statement refers to most of the positive post-mortem findings in cases of chronic nephritis, tuberculosis, cirrhosis of the liver, and carcinoma. They are to be distinguished, however, from cases of terminal septic endocarditis occurring in patients suffering from these same diseases, a class to which, in my original survey, I included in the "latent" group. Although they usually are latent, it would be better to call them "terminal," since the word latent is more properly used for those cases of chronic infection which only come under observation as the result of one of the accidents incident to the disease, and especially embolic infarction.

SEPTIC ENDOCARDITIS.

I now pass on to consider that large and important, but heterogeneous, group of cases of endocarditis variously termed "ulcerative," "malignant," "infective," or "bacterial." The limits of this group are ill-defined. At one end of a possible series into which they may be placed they fuse with the rheumatic group. Poynton and Paine, together with some other workers, describe a malignant rheumatic endocarditis, considering that the rheumatic virus alone,

* The first lecture appeared in THE LANCET last week.

in their judgment a specific streptococcus (the *Diplococcus rheumaticus*), is responsible for such cases. At the other end of such a series are cases in which the endocardial lesions may be regarded as little more than intracardiac thrombosis occurring in the course of a pyæmia. The present nomenclature is avowedly very unsatisfactory. "Ulcerative" has the double objection that, even if we leave out of account for the moment Poynton and Paine's cases of malignant rheumatism, a process of ulceration occurs in severe forms of acute rheumatic endocarditis, as may be seen not infrequently in the post-mortem room, whereas by no means all cases of the bacterial group are associated with ulceration. Indeed, the absence of ulceration is an important feature in some of the more chronic cases. "Malignant" is an ugly and forbidding word to use, and however high the mortality in the fully-fledged cases within this group may be, some patients do certainly weather through. To both the words "infective" and "bacterial" the objection applies equally—that the rheumatic cases are presumably of this nature, despite our ignorance of the cause of the infection, and the syphilitic cases certainly are. The tendency during recent years to change the word "infective" for "bacterial" is curious, seeing that we have no knowledge of infections which are not bacterial. Beyond sharing the general dissatisfaction with any and all of these names, I am not anxious to introduce a new one. But I have a leaning towards a still older name than any of those now used, reactionary though it may sound to speak of "septic" endocarditis. The word commits us to nothing in regard to pathogenesis, yet is expressive of the main differential features between this form of endocarditis and the rheumatic and syphilitic forms. Irving Simons regards the term "septic" as unfortunate inasmuch as the lesions in many cases are not suppurative. But suppurative is by no means a necessary part either of acute or of chronic sepsis. Witness our use of the term in such conditions as "puerperal sepsis" and "focal sepsis"; in neither of these expressions does the word "sepsis" necessarily connote suppuration.

Unfortunately the confusion in words does not end here; confusion has of late years also invaded the terms by which we designate the type of disease as regards the intensity of the morbid processes involved and the duration of them. Although the words "acute" and "chronic," like a good many very common words, cannot be accurately defined, there is general consensus of ideas as to what they mean when applied to diseases. They are a convenient estimate of the two combined qualities already mentioned—intensity and duration. Now everybody seems agreed to the use of the word acute in relation to certain cases of bacterial infections of the type I am now discussing, but the cases that are not acute have been called "chronic," "subacute," and "slow" by different authors. As between "chronic" and "slow" there seems to be no difference. Schott Muller's account of the cases which he described under the name "endocarditis lenta," and which appeared in 1910, the year following the accounts contributed in this country by Osler and myself, makes it clear that he was dealing with the same kind of case which we called "chronic endocarditis." Individual cases of this chronic type had been described earlier, as by Bristowe, Lenhartz, and others. In the same year Libman introduced the term "subacute bacterial endocarditis," and by a rapid series of papers, embodying observations and reflections of fundamental importance, has succeeded in establishing this term, for a time, as synonymous with both the earlier names.

Most of those who have considered the matter, and have contributed to our increasing knowledge of the subject, fail to distinguish between the cases originally designated "chronic" and Libman's subacute cases. And so it comes to pass that these two terms are, for the most part, used indiscriminately. Strangely enough, if there is any tendency to make a distinction between these two terms it is to use Libman's new term for a class of case which, on analysis, seems to be of even slower development and less intense symptomatology than the class of cases formerly called chronic. I shall refer to this point again, because of its important bearings upon pathogenesis.

Acute septic endocarditis was recognised clearly by Wilks and others. Wilks introduced the excellent term "arterial pyæmia," and the words very aptly express the main features of the disease. Little or nothing has been added to our knowledge of this group of cases since Wilks's time. The heart and heart valves share in a general infection. The micro-organisms concerned are highly virulent in character: *Staphylococcus aureus*, *Streptococcus pyogenes* (*vel hæmolyticus*), the pneumococcus, and less often the gonococcus.

The onset of the disease is usually abrupt, the symptoms severe throughout, fever is high, rigors are common, and the course of the disease is rapid. A few doubtful recoveries occur. Death usually takes place in from ten days to a month, but there are fulminant cases which terminate in three or four days, and some, of less than the ordinary severity, which drag into the second month. The disease sometimes complicates osteomyelitis, erysipelas, pneumonia, and less often some other acute focal infections. I deal with it here thus briefly so as to give my groups of cases more clear definition.

Septic Endocarditis of the Right Side of the Heart.

Amongst the cases of acute septic endocarditis which I have observed of late was one in which the tricuspid valve was affected, and this valve alone. Since I regard the case as presenting the clinical picture to be expected in this somewhat rare condition I will give a brief note of it.

A man aged 42 years was admitted to St. Bartholomew's Hospital on the sixteenth day of an acute illness which was ushered in by shivering and headache. The man was seen by his doctor on the second day of his illness and put to bed, where he had been ever since. He became delirious on the third day and was transferred to a nursing home. About this time a patch of pleuritic friction was noted near the region of the right nipple which disappeared in less than a week. There were no physical signs of pneumonia. The temperature chart, which was brought to the hospital with the patient, showed that there had been a fairly continued fever for four days after the record was begun, the temperature reaching 103–4° F. It fell, but not by crisis, on the eighth day of the illness, and remained nearly normal for three days. It then rose sharply, with a rigor, reaching 104–5°. The delirium, which had subsided with the defervescence of the fever, returned. There was no headache. From the twelfth to the sixteenth days there were daily rigors, with profuse sweats. On admission the patient was very ill, with low delirium, dry cough, and slight cyanosis. Examination of the chest yielded a soft systolic bruit near the apex, and a few rhonchi over both lungs. There was a leucocytosis of 10,800. A lumbar puncture gave normal fluid. A blood culture was sterile. Agglutination tests were negative. Complement-fixation test for T.B. was negative. There were no choroidal tubercles seen. No abnormal coliform organisms were found in the stools. The urine was sterile. The spleen was not palpable. No petechiæ were present. Rigors continued almost daily with high quotidian intermittent fever. On two separate occasions definite areas of crepitation, with soft pleuritic rub, were found, one in the right flank and one in the left axilla. There were no sputa. The frequency of the respirations was constantly raised. These, and the persistence of the apical systolic bruit, were the only physical signs elicited. Two further blood cultures were negative, but on the thirty-third day of the disease the blood yielded a growth of pneumococci. The patient, very ill at all times, died on the thirty-fifth day of his disease.

At the post-mortem examination recent vegetations of the septic type were found on the tricuspid valve, and both lungs contained recent infarcts. There was about a pint of blood-stained serous fluid in the right pleural cavity. This fluid and the heart's blood both showed pneumococci in film preparations.

The chief diagnostic features in a septic endocarditis of the right heart, whether tricuspid or pulmonary, is the association of the signs of endocarditis with multiple pulmonary infarction. The intensity and the duration of the disease process depend, as in left-sided cases, upon the virulence of the infecting microbe. The case just mentioned, being pneumococcal in nature, approximated to the acute forms of septic endocarditis. In a case which I included in my first series the micro-organism was a salivary type of streptococcus, and the infection was grafted upon a congenitally stenosed pulmonary orifice. The patient was a young adult, and her illness dated from the extraction of a septic tooth under local anæsthesia. In the first three months of her disease she had 22 attacks of pleurisy. Although she was known to be the subject of congenital heart disease of a mild type, the real nature of the disease was not recognised, and the repeated bouts of pleurisy, from which, however, she seemed to recover well, and a persistent pyrexia, led to her being sent to a tuberculosis sanatorium. Eventually her blood was cultivated and a streptococcus of the type *S. salivarius* was isolated. After an illness lasting for some nine months, and very thorough treatment, she recovered.

Intermediate Cases.

Between this group of acute cases and the group of chronic septic cases which I shall take in more detail there occur cases which I originally termed "subacute"—that is, cases in which the onset was less abrupt, the symptoms less dramatic, and the course less rapid. The causative micro-organisms are less virulent; the gonococcus and the pneumococcus are found in them at times, but more often the cocci approximate to those found in the chronic cases. Those cases termed by Lenhartz and by Poynton and Paine "malignant rheumatism" are of this class. So also, quite frequently, are those young adults who give a clear history of rheumatic fever in childhood or in the teens, and who present clear signs of residual valvular disease. The duration of these cases is from about three to six months. In view of the present confusion in the use of the term "subacute," I think it better to give no name to this group, but to be content to regard them as an intermediate class between the acute and the chronic cases. In any individual case we may, if we feel unhappy without a label, strain a point and call it chronic.

CHRONIC SEPTIC ENDOCARDITIS.

It is to the chronic cases, however, that much attention has been directed of late years, and deservedly so. The experience of the ex-soldier in this connexion is, given no other experience, very striking and very helpful in our understanding of endocardial diseases. But in civilian work also there is a growing recognition of the importance of these cases, and of the urgent necessity of detecting them as early in the course of the disease as possible. I shall deal with some of the main points of clinical interest as these have appealed to me, deferring matters of pathological importance until my next lecture.

Chronic septic endocarditis is a disease of adult life; its maximum incidence comes during the third and fourth decades. It is nearly twice as common in males as in females, a disproportion which exists quite independently of the war cases. It is a very insidious disease; it is not at present possible to estimate, except approximately, the date of its origin in the great majority of cases, nor, in those few cases in which we have good evidence of recovery, can we say when it ceased to be an active disease process. But allowing for these things, it is probable that the disease lasts on an average about six to nine months. Not a few cases reach 12 months, and there are reliable records of cases lasting two and two and a half years. Proofs are accumulating that there are recurring cases, also that spontaneous cures occur. Of these cases I shall say more later.

Pyrexia.

The earliest symptoms of the disease are undoubtedly of the toxic kind. *Chills or sweats* are perhaps amongst the earliest recognisable symptom—but an accidentally discovered pyrexia, as following an influenza, frequently leads to observations that discover something seriously wrong in many of the cases. Pyrexia is almost always present at some time or other in the course of the disease. It has little or no recognisable features to guide us. It is rarely high. Apyrexial periods are not uncommon, even when the temperature is taken four-hourly, an important point in the general observations. Rigors are quite unusual.

Exacerbations in the pyrexia are often concomitant with embolic events and especially with embolism in branches of the splenic artery; the attendant peri-splenitis is probably the main source of the fever in this case. That the pyrexia frequently ranges higher with the occurrence of embolic infarction was pointed out by Douglas Powell in his Lumleian lectures in 1899 when he showed temperature charts illustrative of this fact. But I do not know that attention has been drawn to the fact that the pyrexia not seldom falls to a lower level after these exacerbations and remains there for several days. This is not the result of decreased ability to react to the toxæmia, because the patients often feel fitter during this period of lower pyrexia following an exacerbation. It certainly looks as though the mechanism of embolic infarction results in some instances in the manufacture of antibodies to the infecting agent. It would be interesting to examine the patient's blood for these substances by complement fixation or by other means after such a process, and compare the titre with that obtained at other times. I have wondered if the process of embolism in this disease is not sometimes of service to the patient as well as being, at other times, the direct cause of a tragic end. Provided the infecting microbe is not so pathogenic as to overthrow the local resistance altogether and lead to an abscess, which is rarely the case, and provided the embolus does not occur in a vital part like the brain—an all too common contingency—it is quite possible that the extraordinary slowness with which the disease sometimes progresses may in part be explained by such a view. I have been struck by the fact that in the two cases in which I have seen the largest spleens—in both the organ was visible on inspection of the abdomen and its lower border lay well below the umbilicus—the general condition of the patient was well maintained for months together. In one of these cases the spleen had increased so greatly in size during a stay of five months during the winter in the open air at the south of France, that on the patient's return I wondered if she had developed leukæmia. In the other case my opinion was asked because, though a diagnosis of septic endocarditis had been made provisionally, the very large size of the spleen had actually thrown doubt upon it. In this latter case the effect of splenic infarction, as estimated by attacks of pain in the upper and left side of the belly, was seen in striking fashion in the temperature curve, as also was the subsequent improvement in the general symptoms. Remissions in the disease are often attributed to some special line of treatment which is being pursued, such as the use of a vaccine. Before such a conclusion can be accepted it is important to inquire if the remission be not possibly correlated to splenic infarction.

Some other Symptoms.

Clubbing of the fingers has, since Cotton's observations published in 1922, become a valuable help in

diagnosis. This observer, working in Lewis's clinic, found that of 63 out of 798 cases of structural heart disease in pensioners in whom this sign was present, 44 proved to be cases of chronic septic endocarditis, and of the remaining 19 cases 4 were regarded as doubtful instances of the same disease. This observation has found corroboration from many sources. Starling thinks in the majority of cases the occurrence of clubbing indicates that the disease has been present for some time. It is clear that the association of this sign with acquired valvular disease must put us on our guard.

I referred in my original account of the disease to the frequency of *pains in or about the joints*. I do not think sufficient attention has been paid to these symptoms by subsequent writers. There is a point of great importance in connexion with the manner of their appearance, and that is their suddenness. A second important point is the difficulty that patients often have in locating them. And a third is the absence oft-times of any recognisable effusion when the affected part is a joint, so that I have sometimes spoken of these pains as being arthralgic rather than arthritic. The situations of these pains are very numerous; the regions of the foot and ankle are the most common, then perhaps the hip and shoulder. But the wrist, the back, and the sacrum are not uncommon. The abrupt onset of the pain, and the fact that in not a few cases critical examination discovers a dusky red patch of tender skin in the neighbourhood of the pain in those cases in which the affected part is not a deep structure, makes it probable that the origin of the event is embolic. Many of these pains, even if there be associated swelling, are of quite short duration, passing off completely and leaving no residue, either subjective or objective. In the investigation of a doubtful case, if no history of these pains be given by the patient, inquiry should be made, because it not seldom happens that the event has been considered of no special significance owing to its transient character.

The *ephemeral cutaneous nodes* of French physicians, now generally called after Osler because of the detailed description given of them by our late gifted and lamented colleague, have been proved to possess all the pathognomonic value which he attributed to them. I know of no feature in a suspected case which possesses such dire significance. Again, owing to their fleeting nature, inquiry should be made for these lesions if they are not present when the patient is first seen. No doubt they, too, own an embolic source. The most common situation for them is the pulp of the finger or toe. They also occur on the thenar and hypothenar eminence. I have described analogous lesions as occurring occasionally in the bed of the nails, where a thin splash of red may be seen, accompanied by exquisite tenderness if pressure be made upon the affected part. These nodes arise suddenly, with sharp pain, as though the finger has been pricked; indeed, patients often examine the part carefully to make sure that some sharp object, like a thorn or a splinter, has not been the cause of the sensation. One patient, a typist, found she could not use a particular finger for two or three days because of the tenderness caused by pressure on the keys of her instrument. A few hours after the onset of the pain an erythematous patch appears, pinkish at first, and later dusky red, with oft-times a centre of white skin rather suggestive of an urticarial wheal. There is usually slight swelling of the discoloured skin. The redness disappears, and the tenderness also, in about one to three or four days.

The presence of *petechiæ* in the skin is quite a different sign from that last described; though of much less diagnostic value, it is still very important. As I have pointed out, a favourite and early situation for these lesions is about the neck and clavicles; other common situations are the chest, forearms, legs, and buttocks. Needless to say, two or three scattered petechiæ may be very easily overlooked unless the possibility of their presence is specially borne in mind and the body is scoured for them in a good light. Like the nodes just referred to, these petechiæ are short-lived. They tend to appear in small crops. We have no proof that they are embolic in origin.

There is general agreement that a *leucocytosis*, at least of any considerable degree, is not a feature in these chronic cases. Indeed, the type of count is very apt to be round about 9000. In my second series of cases the actual figure averaged 9300. But a leucopenia is quite common. This contrasts markedly with the leucocyte count in the acute cases, in the second series of which the figure averaged 22,000.

The degree of *anæmia* varies much. It may be so great as to raise the question of pernicious anæmia, especially when a marked leucopenia is present. But the proportionate reduction in hæmoglobin seems to be invariably greater than the reduction in red cells. It is to be noted that some patients retain their blood, and especially their content of red cells, surprisingly well under treatment, especially if kept in the open air. I have seen an erythræmia in one well-marked case, but the hæmoglobin content was well below 100 per cent.

Pallor of the skin is a striking sign in the chronic cases, though if this be marked, and particularly if the curious tint of the complexion to which Libman has given the term café-au-lait be present, the case is generally of considerable standing. As in the case of the actual blood content, however, it is surprising how well some of these patients keep their complexion for a long time if treated in the open air.

Embolism.

Next to the evidence of endocarditis, consideration of which I take later, embolism is undoubtedly the most constant of all the signs of the disease. It was recorded in 142 of my second series of 162 cases. The vessels affected were, in the order of frequency, those of the spleen (108 cases), the kidneys (98 cases), the brain (26 cases), and the arteries of the limbs (13 cases). To these situations must be added the retina and the skin. Embolism, or one of its sequels, is not infrequently the event which brings the patient under observation, and in many instances of apparently mysterious signs and symptoms it is this process which offers a satisfactory clue to the problem. Be it remembered that the size of the detached fragment of material may vary from something microscopic to something so large as to obstruct a vessel of considerable size.

1. The *spleen* is the most commonly affected of the internal organs. The more chronic the case the more common is it to find the spleen enlarged during life; indeed, it is probably correct to say that in chronic cases a palpable spleen is an invariable finding. Early in the disease, and when the organ is as yet not palpable, pains in the upper left quadrant of the belly, or hereabouts, are highly suggestive. These pains, associated with fever, and perhaps referred to the flank, are sometimes mistaken for pleurisy; when friction is present, as it may be, the error is difficult to avoid. But pleurisy may actually be present in addition. I have only once seen a pleurisy with effusion (which was aspirated) complicate splenic infarction. Although, as already mentioned, in some of the slow cases the size of the spleen may be very considerable, we must not conclude, from our knowledge of the great frequency of infarction in it, that this is the only factor in the enlargement. There is doubtless the general factor of toxæmia, and there is also the factor of anæmia. Unlike the spleen in acute septic endocarditis, the organ is generally quite firm, and the infected areas almost never suppurate; the nearest approach to this seen post mortem is some degree of grumous softening; even this is uncommon.

2. *Kidney.*—If we consider in connexion with this organ that the glomerular lesions which are so characteristic a feature are embolic in nature, as

they probably are, then it is likely that the kidney is affected by the embolic process quite as often as the spleen. The frequency of embolism here must not, as has often been pointed out, be judged only by the appearance of a hæmaturia; in many cases the number of red blood cells passed in the urine is so small as to call for microscopical search, and this should be undertaken very frequently. I have pointed out that a small hæmaturia may be missed, but a brief albuminuria consequent upon it may be detected; intermittent albuminuria should, therefore, suggest renal infarction just as intermittent hæmaturia does. The process of renal infarction is generally, but not always, painless. In one case under observation the renal emboli were accompanied by severe lumbar pain, so much so that calculus and tuberculosis were both suspected.

We owe especially to Gaskell and to Baehr our knowledge of the intimate changes in the kidney, only ascertainable by microscopical examination. These investigators described a form of glomerular change which they regard as peculiar, and to which Libman, in particular, has come to attach great significance. Indeed, according to the last-named observer, the discovery of the hyaline-like change in portions of the glomeruli which is the end stage in the Gaskell-Baehr type of nephritis enables us to say with confidence that an associated sclerotic heart-valve is the result of a "healed bacterial endocarditis." If this conclusion be borne out by other workers, and we may regard the lesion as almost a specific effect of septic endocarditis, its value in post-mortem interpretations will be very great.

3. *Brain.*—Cerebral embolism is by far the most serious of all the common events of this nature. It not infrequently brings a latent case very rudely into prominence; it often determines the fatal ending, and not seldon at a stage in the disease when, on all other counts, a hopeful period of quiescence has arrived in regard to the toxic process. Experiences like these it is which lead the physician to speak with caution even in the face of definite improvement in the general state, including quite lengthy periods of apyrexia. Death in this disease may be accidental and mechanical as well as the natural termination of an intractable toxæmia. The most common clinical result of cerebral embolism is hemiplegia, with aphasia if the hemiplegia be right-sided. Monoplegias are much less common. The resultant cerebral shock is usually considerable, and the outlook, even immediately, is grave. I have twice seen a second hemiplegia on the other side, the interval between the two attacks being in one case only three days, in the other case 12 months. The sequence, originally described by Douglas Powell, of hæmorrhage following the septic embolus, is common, as post-mortem experience shows, but acute cerebral softening, short of actual hæmorrhage, is perhaps quite as common a finding.

Irritative cerebral effects occur as well as paralytic, and these may sometimes be correlated post mortem with subarachnoid hæmorrhages. I found 10 such lesions recorded in 118 post-mortem examinations. In none of four cases in which choreiform movements were present was there, unfortunately, any opportunity for post-mortem examination.

4. Plugging of arteries in the *limbs* is probably more common than is thought. Unless the arteries be carefully examined a bout of pain and some swelling, say in the wrist and hand, or in the foot, is sometimes considered to be arthritic in nature, when it is really the result of embolism in the radial or one of the branches of the posterior tibial. That the arterial pulse is not often obstructed for long, and rarely completely obstructed, adds to the deception, since coldness of the part beyond the partial block, still less gangrene, does not occur. We must suppose that the absence of these last-named effects is due to the friability, not to say softness, of the embolus, allowing of rapid disintegration, or channelling or both. All this is in marked contrast with the results following embolism, if this takes place in (non-septic) mitral stenosis, when gangrene is not at all uncommon. A common sequel to these septic emboli in vessels in the limbs is *aneurysm*, the development of which helps to explain the absence of serious nutritional changes in the part supplied by the affected vessel.

I have twice seen *mesenteric embolism*. In one case there was an attack of abdominal pain, followed in three days by a swelling about the size of a golf ball and situate just to the right of the mesial line and a very little below the level of the navel. Despite the unusually discrete nature of the lump and its peculiar situation, the case would doubtless have been considered one of acute appendicitis had it not been that about the time of this occurrence the patient became suspect on the score of a possible septic endocarditis. A positive blood culture determined the diagnosis. In the other case a surgical colleague removed a small aneurysm from the right ulnar artery near its origin from the brachial. A routine digital examination of the rectum had discovered the presence of two small firm lumps, lying close together, and felt easily through the mucous membrane of the bowel. They were thought to be enlarged glands. A post-mortem examination later revealed the fact that these were healed aneurysms on the superior mesenteric artery. There was a third small aneurysm on the hepatic artery. Death had occurred from hæmorrhage into the cerebellum, no doubt secondary to another embolism in this situation. Aneurysm of the *ophthalmic artery* occurred in one of my cases and was observed conjointly with me by Foster Moore.

State of the Heart.

The state of the heart in chronic septic endocarditis deserves a note. The salient feature, and one upon which there is general concurrence, is that it maintains its functional capacity in a very striking manner. Indeed, it may be said with truth that this is not a disease of the heart at all, but of the endocardium; hence my expression in my first lecture, "endocarditis vera." This fact contrasts markedly with the state of things seen in a rheumatic endocarditis, where, to a large extent, the converse applies. Many of the patients in the disease now under consideration enjoy complete cardiac sufficiency for months after they fall victims to their infection. This is no doubt the reason why so many of them do not come under our notice until long after the initial stage of the process is past. Soldiers remain in the firing line, doctors continue their arduous profession, farmers proceed with quite heavy labour, until one or other of the accidents of the disease leads them to report themselves. Even then it is often difficult to persuade them to consider themselves ill. This retention of cardiac efficiency, combined with that buoyancy and optimism which I have called "spes endocarditidis," renders these patients oft-times difficult to treat. A doctor, casually mentioning to his partner that he could not see the print on the extreme right side of his newspaper, submitted to a cursory examination; it was found that he had the cardiac signs of aortic incompetence and a retinal hæmorrhage; on fuller examination a diagnosis of septic endocarditis was not difficult. He refused treatment and carried on his work. A month later he attended a difficult confinement, using forceps. He woke the next morning to find himself hemiplegic, became comatose a week later, and died.

It is generally agreed that such evidences of heart failure as auricular fibrillation do not occur in these cases, another testimony to the same fact. This relative absence of myocardial involvement tends to persist to the last in many of the cases, though there is considerable divergence in the figures given by different authors as to the frequency of terminal heart failure. This divergence probably depends upon the fact that when small numbers of cases are dealt with the type of case which bulks most largely in the series from which the figures are calculated determines the figures. Taking my two series together,

I found death with cardiac failure to occur in from 40 to 50 per cent. But both series contained a good many examples of the old rheumatic type of case. Yet in the groups which chiefly include ex-soldiers, death has been due to heart failure in much the same proportion as this; Cotton gives 47 per cent., and Starling gives 60 per cent., in their two series respectively.

Renal failure is admittedly the most frequent cause of death next to heart failure. After this, in probable order of frequency, come cerebral causes (and especially coma following embolus), exhaustion from the prolonged toxicity, and pneumonia.

DIABETIC COMA WITHOUT ACETONURIA.

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THE following case of diabetic coma possesses some unusual features.

A youth, aged 21, who had been on insulin treatment since May, 1923, and whose symptoms were so severe as to necessitate three injections of 15 units daily in order to keep the blood-sugar approximately normal and the urine free from sugar and acetone, developed a severe gastro-enteritis on Oct. 1st, 1925. As a result of this he was unable to take food and, owing to a misunderstanding, insulin was also withheld. On Oct. 4th he had very severe abdominal pain which suggested to his medical attendant the onset of peritonitis. He was sent from the country to Manchester, a distance of 80 miles, where I examined him about 5 o'clock the same evening. During the journey he became unconscious, and when I saw him he was in typical diabetic coma with a feeble pulse of 128 and a temperature of 98° F. The heart sounds were very feeble, and he appeared to be dying. A specimen of urine was loaded with sugar, but no acetone bodies were present. There was also a faint cloud of albumin. 40 units of insulin were given immediately, and afterwards 20 units every three hours throughout the night. Lemonade containing glucose was given in unlimited amount. By next morning the patient had partially recovered consciousness, but the pulse was still 120 and very feeble. During that day 80 oz. of urine were passed, sugar being present in all specimens, but no acetone bodies. From that time 20 units of insulin four-hourly were given, this being reduced gradually to 15 units t.i.d. as the patient improved. The trace of albumin persisted for three or four days and then disappeared. At the end of four days the glucose lemonade was discontinued and a solid diet gradually substituted. Except for one day, throughout the illness there were no acetone bodies present in the urine and, on that one occasion, only the slightest trace could be detected by ferric chloride solution.

The patient made an uninterrupted recovery, and when seen recently had resumed the diet of approximately 2100 calories and had returned to the dose of insulin which he was taking before his illness. The urine was sugar-free and the fasting blood-sugar was 0·19 per cent.

The features of interest in this case are: (1) The onset of coma heralded by acute abdominal pain simulating peritonitis. (2) The treatment with large doses of insulin, together with an unlimited supply of glucose solution. This prevented the onset of hypoglycæmia, and probably with the aid of insulin was helpful in repleting the glycogen stores and thus preventing complete cardiac muscle failure. As the sugar-tolerance after the illness was the same as before, the large amount of sugar given did not appear to have done any damage to the pancreas. (3) The almost entire absence of acetone bodies is an unusual feature in a case of coma. Such cases have been recorded, but this absence has been attributed to renal failure. In this case, however, not only was there no inability to excrete sugar-containing urine in large quantities during the first week, but even when recovery had occurred and the kidney function was then presumably normal there was no excretion of accumulated acetone bodies. Here at least it is difficult to believe that the direct causation of coma could be attributed to them.

A STUDY OF SOME ASPECTS OF MINERS' NYSTAGMUS.

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IN 1920 I was invited to become a member of the Miners' Nystagmus Research Committee of the Medical Research Council, and found it necessary to examine the whole of the existing evidence. There was a great deal of information, varying much in its value. Numerous papers had been published, and their contents accumulated without any very critical examination of the evidence contained in them. To get an insight into the conditions that prevailed it was necessary to read as much as possible of the writings of previous workers, to weigh the evidence as carefully and as dispassionately as possible, and to reinvestigate all the material which seemed of any real value.

Two different periods may be studied. The first ranges from 1870–1907, and the second from 1907 until the present time. In the epoch 1870–1907, Simeon Snell and Sir Josiah Court were the two principal writers in this country. In the evidence he gave before the Departmental Committee of 1907, Snell deals with the question of incapacity, his views being founded on over a thousand cases. He recognises a large incidence, but gives no statistics. In "Miners' Nystagmus," 1892, he deals with the result of examination of 134 cases, and dwells almost entirely on the causation. The evidence which Simeon Snell gave in the year 1907 may be epitomised as follows:—

"Errors of refraction have no effect on miners' nystagmus. It is difficult to define which men of those who have marked oscillation are incapacitated; many are affected but not suffering. If miners' nystagmus is scheduled, a very large number of miners will seek compensation for slight amounts of miners' nystagmus, not severe enough to prevent them from working. It is very difficult to separate the genuine from the other cases. Probably a large proportion of miners will continue their work as they do now, and experience no pain or difficulty from the nystagmus; on the other hand, a large number of men who are able to do their work may seek compensation. Compensation will not be good from the men's point of view nor from the employers; it may throw so many men out of work and add enormously to the cost of coal-getting. A typical severe case of miners' nystagmus is fit for surface work in a few weeks, and fit for pit work, eventually. I cannot remember ever meeting a miner who had given up work for nystagmus five or six years before and who had not resumed work below ground. I do not think a very great proportion of men are incapacitated by miners' nystagmus, only a small proportion; nor that it is a very great evil, but it may be considered so under compensation."

Sir Josiah Court, whose work has proved so remarkably accurate (1891), gives definite statistical information as to the incidence (see "Miners' Diseases"). In 1892 he examined the whole of the men, 735 in number, at two of the Stavely pits. Of these, 376 were actual coal-getters, of whom 45¾ per cent. had miners' nystagmus. Of stallmen in safety lamp pits generally he found about 40 per cent. had nystagmus, whereas of those in naked light pits only about 3 per cent. Sir Josiah Court in the same book (pp. 49 and 50) makes the following remark on incapacity:—

"An Act of Parliament should be passed restricting the time for which compensation should be paid for miners' nystagmus to four months."

A careful study of the evidence given in 1907 brings many interesting details to light; for instance, it is interesting to read the evidence, medical and otherwise, given on behalf of the Lanarkshire Miners' Union, where, according to Dr. Freeland Fergus, miners' nystagmus now causes a lot of incapacity with loss of vision and other untoward results. Mr. R. Smillie, for the Lanarkshire Miners' Union, said:—

"We have quite a number of miners' nystagmus cases in the 50 districts of Lanarkshire. Ophthalmic specialists

[1] Stallmen are both the coal-getters, or hewers, and the fillers, who fill tubs with coal in the working-place or stall.

advise men not to go underground again after miners' nystagmus, but men do go back and have no relapse."

Dr. Andrew Bell, for the Scottish Miners' Federation, said:—

"Miners' nystagmus is a small thing, and does not incapacitate materially for the work of coal-mining; it may incapacitate for a week or so in the most severe cases. Compensation is usually asked for a week or two and should only be granted on expert evidence that the men cannot work. When a great deal of subjective distress is present with a slight degree of nystagmus, the severity of the subjective symptoms would be due to something else apart from the nystagmus."

In this he was supported by other witnesses called by the Scottish Miners' Federation, and also those of the Northumberland Miners' Federation.

Investigations Abroad.

In France and Belgium, Dransart and Romiée were the principal early writers. Dransart, in 1877, gave an excellent description of the condition, on which it would be hard to improve even to-day. The physical signs were all carefully recorded, while of the symptoms he says:—

"When walking on the roads below ground all objects dance, so that walking is difficult, like that of a drunken man. At the coal face sight is soon completely befogged, and the miner goes on striking without seeing clearly; it is habit not sight which guides his pick. He looks down; his sight then rapidly returns and he resumes his work for a time. Then he has to rest himself again, and so on."

Dransart describes the effect of alcohol, and finds that errors of refraction are of no importance in the production of miners' nystagmus. In 1882 he had seen more cases, the bulk of which had good visual acuity—i.e., 50 per cent. had 6/6 and a further 25 per cent. had 6/9. He says:—

"Miners' nystagmus lasts as long as the man continues his professional work. When he stops he is cured in from six weeks to six months time."

In 1913 he wrote again, classifying miners' nystagmus into three groups—mild, moderate, and severe. Of all cases 99 per cent. were mild. In mild cases the oscillation is only obvious when looking up in daylight; in the moderate form oscillation is obvious when looking at about the horizontal level in daylight; in the severe, it is obvious when looking at or below the horizontal level in daylight, and is accompanied by functional trouble. The field of vision is undamaged, as is colour vision; the visual acuity, diminished when oscillation is taking place, recovers fully as soon as the eyes are still. Any disturbance of the general health, any accident, alcoholic excess, or fatigue, may change the mild form of miners' nystagmus into a moderate or severe form.

Incidence: By examining all the miners as they left their work he found that from 12 to 20 per cent., according to the light employed, of the miners in the north of France were affected by miners' nystagmus—that is, 15,000 were affected. Of these, not more than 50 in any one year had the disorder in a severe form. He records a case of a doctor who could produce oscillation like that of miners' nystagmus. He estimates the duration of incapacity from the mine as from two to six months in severe cases. Miners' nystagmus itself may last nearly the whole of a miner's working life, either in the mild form or with an intensity which varies from the mild to the severe form, to return to the mild again. He had watched some of the cases for 30 years. Miners' nystagmus in the mild form, 99 per cent. of all cases, is compatible with excellent general health and perfect fitness for work.

Work of Romiée.

Romiée, of Liege, examined a very large number of miners in the years 1877–78, and again in 1892. His work was particularly good. He was the first to examine large numbers of men as they left the pit and get the percentage of those affected, noting the particular work on which they were engaged, and the light with which they were working. He was, I believe, the first observer to get the true incidence of the disorder. He also examined the same collieries and many of the same miners a second time after an interval of several years, and tested the incidence again so as to compare it with his previous findings. He notes that miners with squint are not unduly affected by miners' nystagmus. Fatigue increases the physical signs; a good sleep decreases them. Visual acuity is normal except when oscillation is very marked.

He tested the light given by safety lamps, noted the diminution of light due to coal-dust on the lamps, and the reduction of illumination at the working place due to the necessity of putting the safety lamp, so that it should not be broken, much further from the work face than the candle or naked light. He judged the severity of any attack by the degree of elevation of the visual regard at which the oscillation commenced in daylight. He says:—

"In very rare and temporary cases, defective sight due to the oscillation may make it impossible for a miner to work, and this may recur from time to time, though this does not keep a miner long away from the coal face, even though his eyes remain much as they were. When a miner cannot do his own work, a temporary change to other work, either in the pit or on the surface, is an excellent means of stopping the discomfort and curing the nystagmus. The giddiness is not dangerous and it does not make miners fall or break their safety lamps.

"The condition of a nystagmic miner at work, despite the little inconveniences which he experiences, is much the same as that of any other miner. The affliction is so well tolerated, even in the most pronounced cases, that a miner cannot be persuaded to remain under treatment for nystagmus alone. An ailment which only furnishes a rare example to medical view unless searched for cannot be considered serious. Miners whose nystagmus has slightly improved after a spell of surface work return to work at the coal face, and do not experience a return of the discomfort which made them stop underground work."

Pechdo, in 1893, struck by the much greater incidence of miners' nystagmus in safety-lamp pits, particularly in some of them, than in naked-light pits, came to the conclusion that poisoning by coal gas was the cause of miners' nystagmus.

Modern Writers.

Of the modern writers Stassen, Ohm, Llewellyn, and Robson deserve consideration.

During the years 1914–19 Stassen ("La Fatigue de l'Appareil Visuel") made a most comprehensive investigation of the conditions under which miners' nystagmus developed in Belgium mines. He examined the entire personnel of several different mines, including zinc and iron mines. He made exact notes of the class of work done by the men examined, the depth of the seams worked, the thickness of the seam, and of the lights employed. He gives details of the examination of 11,179 miners employed in 19 different safety-lamp mines, of whom 7925 had been examined both at the commencement and at the end of a shift of work. This was in addition to 36 workers in iron mines, three of whom had miners' nystagmus; 40 workers in two zinc mines, four of whom had miners' nystagmus; and 76 workmen in a naked-light coal mine, of whom 15 had nystagmus. He gives all conceivable information, with carefully worked out statistics of more than 13,000 men examined, and discusses almost every possible aspect of the question with great minuteness. The book is a perfect mine of information and should be read by everyone before taking part in any discussion on the subject.

Coppez has written an able book on nystagmus in which he gives valuable information on the subject of dark adaptation. Ohm, of Germany, has written a good deal; his views on the duration of incapacity caused by miners' nystagmus agree with the views of modern continental experts, such as Stassen and Coppez. Very few miners stop underground work for more than three months on account of miners' nystagmus in the Bochum district of Germany. As regards the causation of miners' nystagmus, he maintains that the eyes are normally in a state of rhythmical movement, controlled by various stimuli received by the retina. After exposure to defective

light for a considerable time, these rhythmical movements become coarser and slower, and can be recognised as oscillation of the eyes. As a Tyndall research scholar, Llewellyn measured the amount of illumination which fell on the coal face, and so confirmed the work of Romiée; he has since written a well-known book on the subject. Robson has taken quite extensive extracts from the work of Marie Stopes on the "Chemistry of Coal," but has produced no evidence, experimental or otherwise, as to the toxic gas which causes miners' nystagmus. Such a gas may exist, but mere assertion is not proof.

Home Office Statistics.—These are published every year, and give the fullest information as to the number of successful claims for compensation and the duration of these claims. It is well to note that at the end of 1921 more than 600 miners in this country had been in receipt of compensation for five years, and 59 for more than ten years.

The Ascertained Facts.

What data can we obtain from these writings? The actual incidence of miners' nystagmus, as obtained in the only scientific way by examination of all the miners engaged in different pits, was very much greater in safety-lamp pits than in naked-light pits, Sir Josiah Court's figures being corroborated by all the continental observers. Roughly, 50 per cent. of all actual coal-getters had gross oscillation of the eyes visible in daylight. How many more would have had traces of oscillation if examined in a dark room after exercises we can only guess; probably, judging from my own experience, the percentage would have been considerable.

The evidence is also conclusive that miners in old days seldom stopped work for miners' nystagmus, and then only for a few weeks, or very exceptionally months, during which they worked on the surface. We must remember that in the period 1870–1907 the working hours were much longer, and the safety lamps gave less light than those now in use. On the other hand, there were more naked-light pits at that time and the average depth of the pits was less, although the ventilation was certainly worse than it is now.

What are the conditions to-day? (1907–1925). We have no recent British statistics as to the actual incidence of miners' nystagmus under post-war conditions, and this, I hope, will shortly be rectified; but from what evidence there is, it would seem that the true incidence rate is, if anything, less than it was. There has been a marked increase in the percentage incidence of claims for compensation for incapacity due to miners' nystagmus. This rose from 0·05 in 1908 to 0·42 in 1922 in this country, though there has been no corresponding increase in Belgium, France, or Germany.

The facts which emerge are these. Miners' nystagmus is found both in naked-light and in safety-lamp pits, whether coal, iron, or zinc, the incidence being far greater in safety-lamp pits. This is due either to the diminished light of safety lamps, or to the poisonous effect of some ingredient in the gas which necessitates the use of the safety-lamp. The worse the illumination at the coal face the greater is the incidence of miners' nystagmus. In naked-light pits, or even in zinc mines, cases of miners' nystagmus do occur. The more gassy the pit, the dirtier are the lamps and the less is the light given by them. Conversely, the worse the light the greater the impurity of the air.

What is the toxic ingredient of the gas found in the pits? Is carbon monoxide—the most toxic—the cause? Prof. J. S. Haldane (first report, Miners' Nystagmus Committee) has shown that insects without hæmoglobin can live for a prolonged period in 80 per cent. carbon monoxide. Logan and Glaister report many more cases of carbon monoxide poisoning in workers in lime quarries, gas-engine shops, &c., than in miners, with whom it generally seems to be the result of fighting a gob fire. Nothing in the least like miners' nystagmus occurs in carbon monoxide poisoning, so it is improbable that carbon monoxide is the cause of miners' nystagmus.

Are there any other non-explosive toxic gases in coal, zinc, and iron mines which, when inhaled in small quantities for a lengthy period, cause miners' nystagmus? It may be that there are, though so far no evidence has been produced to show that such a gas exists or can cause anything even remotely resembling miners' nystagmus. Congenital nystagmus, labyrinthine nystagmus, and nystagmus due to cerebellar lesions we know. Encephalitis lethargica does give rise to a form of nystagmus not unlike miners' nystagmus.

The first task I set myself was to reinvestigate the question of the influence of errors of refraction on miners' nystagmus. For this purpose I examined just over 100 consecutive cases of miners as soon as possible after they had been certified to be incapacitated by miners' nystagmus. This, besides giving valuable evidence of the unimportance of errors of refraction in miners' nystagmus, also showed that there was a considerable variation in the severity of the attacks for which certificates of disablement were given. This necessitated an attempt to classify the severity of the attacks. That was my next task.

A visit to Strassen and Coppez in Belgium, and letters to Ohm in Germany, confirmed the opinion I had formed that in Belgium and Germany miners do not now stop away from work either on the surface or below ground nearly so long as the British miners do. I came to the conclusion that this was not because the incidence of miners' nystagmus is less severe in Belgium than it is here, but because the determination of the incapacity is entirely in independent medical hands in Belgium, and also because the work selected by the Government medical expert for each man is immediately available for him. Information received from Germany and France shows that miners' nystagmus is about as prevalent there as it is in Belgium, and that the duration of incapacity is much the same. The method of dealing with it is also very similar.

Summary.

1. The actual incidence of miners' nystagmus among miners examined at work was the same, during the period 1870–1907, in France, Belgium, and Great Britain. 2. The incidence of incapacity due to it was also the same in this period, 1870–1907, in all these countries, and was very slight and of short duration. 3. Since then the claims for compensation for incapacity due to miners' nystagmus have increased, both in this country and on the continent; but in this country the number of new claims has increased very much more in proportion, and the duration of the period for which compensation for incapacity has been claimed is far greater in this country than in Belgium, France, or Germany. 4. In American coal-mines little is known or heard of miners' nystagmus, or of any incapacity being caused by it. 5. In this country there is a wide divergence in the severity of the miners' nystagmus for which compensation is claimed.[2] 6. By far the greater number of observers, particularly of those who have made an extensive examination of large numbers of men at work, are agreed that those miners are most affected who work in the poorest light, and they attribute the condition to working in defective light. 7. Prof. Haldane, who has an unrivalled experience of the conditions of coal-mining, declares that the incidence of carbon monoxide in coal-mines is not greater than it is in many large towns where coal is being burnt. Moreover, he has shown that carbon monoxide is not a tissue poison except from its effect on hæmoglobin.

The increase in the incidence of claims for compensation for miners' nystagmus, and of the duration of those claims as compared with that which prevailed in this country during the period 1870–1907, and prevails now on the continent, would seem to be due to claims for incapacity not being decided by a few

[2] See second report, Miners' Nystagmus Committee, pp. 18–21.

picked medical experts as on the continent. As a result confusion has arisen between a condition due to miners' nystagmus and a condition which is the result of a subconscious desire for unearned pecuniary gain, which is found not only in miners suffering from nystagmus or injury to their eyes, but in many other claimants for compensation for injury to eyes, &c.; in members of the general public—e.g., "railway spine and shell shock"; and among those who claim to receive the Old Age Pension before they attain the age of 70, giving defective eyesight as their reason. The remedy is obvious.

Reinvestigation, so far as I have gone at present, confirms the views expressed by the earlier writers — Sir Josiah Court, Simeon Snell, Romiće, Dransart, and of the more recent ones — e.g., Stassen, Coppez, and Ohm—as to the physical signs of the disorder, the effect of errors of refraction and the amount of incapacity caused by it. Its cause I still regard as unsettled, the existing evidence is strongly in favour of its being a compensatory effort on the part of the central nervous system to overcome the effect of working in defective light.

Further Research.

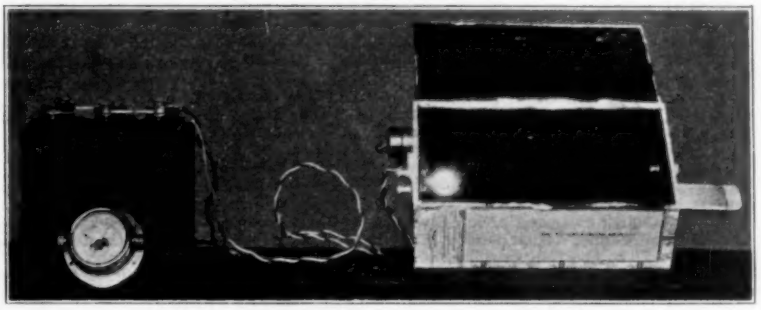
When these conclusions had been reached there were two factors which particularly invited fresh investigation. The first was the behaviour of the eye under conditions of dark adaptation; the second, for reinvestigation, was the incidence of miners' nystagmus in different pits under different conditions.

The first required a good deal of preliminary work. It is obvious to everyone that as daylight fails the differentiation of colours in a landscape, so infinitely varied in bright sunshine, becomes less and less marked until by moonlight everything is almost the same colour, and by starlight only the outline of objects can be detected in the shades of black and white.

After many experiments which failed to satisfy me I evolved the following scheme:—

I got a box about one foot long, lined its interior with black velvet, fixed a standard one-candle power lamp at one end of it (Fig. 1), and made an aperture at the other through which a slender beam of light could be projected across an otherwise absolutely dark room on to a black cloth covering a shelf on which test objects could be placed. The brightness of the illumination was checked by a luxometer (Edgcumbe and Everett) at the point of examination or at some known fraction of the distance in the case of feebler illuminations. Three observations were taken by each of two observers. The lamp in the luxometer and the lamp used to give the beam of light being exactly similar, it was easy to measure the light. For test objects I employed wooden cubes, 2, 4, and 6 cm., on which could be pasted paper of various colours, or black or white paper with the test letters of Snellens' type. The letters were spaced at measured intervals. To ensure that the test objects were at a uniform distance from the eye, I got a wooden frame made which was part of a circle with a radius of one foot, into which was set a straight piece like the spoke of a wheel, so that when the free end of the spoke was place against the observer's face just below the eye he was using, his eye was equidistant from each part of the circle (Fig. 2). It was covered with a black cloth when in use. I also had a slot fixed in the box which contained the lamp, so that dark glasses of various kinds could be fitted over the aperture in the box in such a way that the beam of light had to pass through them.

FIG. 1.



The apparatus used for projecting a beam of light.

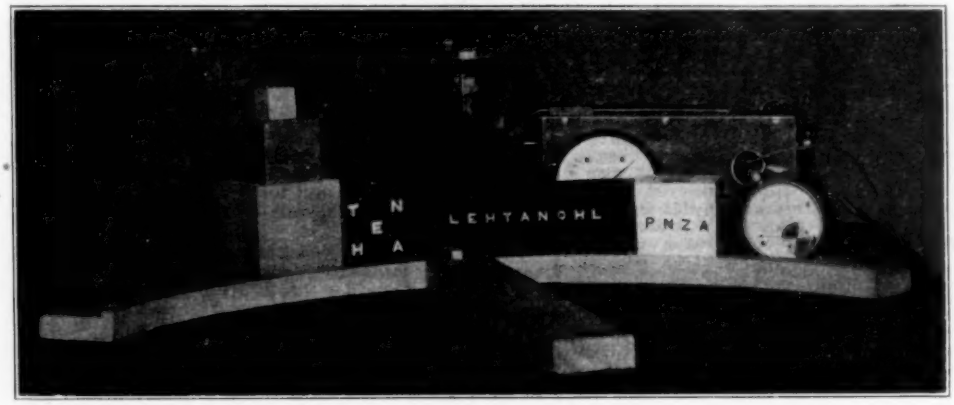
Experimental Results.

By employing this apparatus I obtained the following results, taking the average of several readings by different observers, all of whom had been 30 minutes in a dark room before observations were made. With an illumination which varied from 4 candle-power to 0·00006 candle power:—

1. With 0·085 foot candle, Sn 0·6 was read at the centre or point of fixation and up to an angle of 1° from it; Sn 0·9 was read at the point of fixation and up to 2·5° from it; Sn 1·5 was read at fixation and up to 3·5° from it. The field of vision appeared to be evenly illuminated. Visual acuity was brightest in the centre of the field. This central area extends to from 1° to 1·5° from the fixation-point, and is surrounded by a zone in which the light flickers; this extends from the margin of the central zone for a distance of from 2° to 3° from the centre in different observers—i.e., the central zone has a radius which subtends an angle of 1° to 1·5°, and the second zone a breadth of 1° to 1·5° beyond it.

2. With 0·02 foot candle, colours—e.g., red, green, and blue—were easily seen, central fixation was easily maintained, and no flickering or fatigue was noticed. Sn 0·9 could be read at the point of fixation. Sn 1·5 at the point of fixation and up to an angle of 1·5° from this.

FIG. 2.



Test objects and wooden frame.

3. With 0·01 foot candle, a few letters of Sn 1·8 could be seen. Sn 2·1 could be read imperfectly, and Sn 2·6 read correctly. Two observers saw better at the point of fixation than elsewhere; the third observer better at a spot 4° from the centre. The legibility of type was greater at the centre and at 4° from the centre than elsewhere.

4. With 0·005 foot candle, Sn 3·6 could be read. One observer saw best at the point of fixation, one especially well from the point of fixation to 4° from it. The third saw best at 4° from the point of fixation.

5. With 0·0036 foot candle, Sn 4·8 and 3·6 were partly read by all three observers, two of whom saw equally well at the point of fixation and at 4° from it, while one saw better at 4° from the point of fixation on the temporal side than at the point itself.

6. With 0·002 foot candle, a central scotoma was clearly manifest; Sn 4 was read most clearly at 2° from the fixation-point, above, below, and to the inner side of it, and from 2° to 4° to 4½° on the temporal side of it. Central letters were just visible beyond 4½° on the temporal side, but not legible; at 10° letters were visible but only occasionally legible.

7. With 0·0012 foot candle, Sn 4·8 was read. Colours were just distinguishable, visual acuity was sharpest in a zone from 2° to 7° to the temporal side of the point of fixation. Colour vision, also form vision, soon faded as the test object was moved beyond 7° from the centre. Central fatigue was very marked; anything stared at became very indistinct; flickering was noted, shadows formed and crossed the visual field. Binocular vision was much better than monocular.

8. With 0·0006 foot candle there was a very definite central scotoma involving the whole central area with a radius of 5°. The centre and two adjacent letters of Sn 4 faded; next the whole field faded and then returned, including the central letters. This was followed by flickering, the central letter faded, and then the next two; they came back, but the central letter did not. When first a light of 0·0006 was turned on all the letters of Sn 4 were visible; a central scotoma formed in six seconds to two observers, and in 14 seconds to a third (an average of three observations each). The scotoma increased in size in 8, 12, and 23 seconds respectively to the three different observers. Letters became visible again in from 45 to 65 seconds; this was then followed by the stage of flickering and the reformation of the scotoma. In this test the letters subtended an angle of about 1°, they were white on a black background; red and green squares could be detected easily by simultaneous contrast. Fixation was hard to maintain.

9. With 0·0001 foot candle, a one-eyed man who had lost the sight of one eye in infancy was tried; after adaptation for 30 minutes, visual acuity was Sn 4; red was accurately distinguished, also green and yellow; visual acuity was most accurate at 5° and 12° on the temporal side of the point of fixation. The point of fixation faded, and the letters at 2° from the point of fixation faded even more quickly; he had a ring scotoma extending to 2° from the fixation-point. His field of vision extended to 20° on the temporal side and 10° on the nasal side. With him, as with other observers, there were two clear zones on the temporal side of fixation, the first at 5° to 7° from it, and the second at 12°, with a relative scotoma between them. With the one-eyed observer the letter C appeared to rotate clockwise in this dim light. Other observers noticed a movement of the letters which jumped in and out of the line. Flicker and fatigue were quite marked.

10. With 0·0006 foot candle, Sn 24 was read with binocular vision. One observer could distinguish red from green correctly by simultaneous contrast. The best visual acuity was at 5° on the temporal side of the point of fixation. Beyond 20° to 30°, even on the temporal side, a large white square subtending 8° was not seen. The central scotoma was very marked; moving objects were more distinctly seen than stationary ones; fatigue was very marked, and the observer's eyes were very uncomfortable.

Experiments were made by interrupting the main light and by flashing another light at an angle of about 40° to the line of visual regard. These caused a marked increase in the feeling of fatigue, but nothing else was observed. For comparison it may be noted that the light of the full moon was 0·05 by the photometer.

These experiments show that in very dim light there is a relative central scotoma with a ring of clear vision round it, with a restriction of the peripheral field of form vision. In addition to an increased difficulty in maintaining fixation, there is a tendency for fixed objects to move in a circle.

With 15 foot candle-power, Sn 0·3 was clearly legible; Sn 0·6 was clearly legible at the point of fixation and up to 3° on the temporal side of fixation; Sn 0·9 was clearly legible at the point of fixation and up to 4° of the temporal side of fixation; and Sn 1·5 was clearly legible at the point of fixation and up to 6° on the temporal side of fixation. 1 mm. squares of red and green could be clearly seen up to 7° or 8° respectively from the point of fixation.

The experiments were then repeated with the following results. With a reduction in the intensity of illumination:—

With 0·085 candle-power Sn 0·6 could be read and up to 1° from it; Sn 0·9 up to 2° from it; and Sn 1·5 up to 3° from it.

With this amount of light the visual field is fairly even; the centre is the best.

With 0·02 candle-power, Sn 1·5 was visible at the point of fixation, and up to 2½° from it. Central vision is the best.

With 0·01 candle-power, Sn 2·6 was read at the point of fixation and at 4° to the temporal side of it. In various observers these two points vary in intensity, being nearly equal. At 2° from the centre letters are not well seen.

With 0·005 candle-power, Sn 3·6 was read equally at the point of fixation, and at 4° on the temporal side of it.

With 0·0035 candle-power, Sn 4·8 was read rather better at 4° on the temporal side than at the point of fixation, but fairly evenly.

With 0·002 candle-power, Sn 4 was read most clearly at 2° above, below, and to the inner side, and from 2° to 4° on the temporal side. Central scotoma was quite marked. Letters beyond 4° visible, but not legible up to 10°. A letter was occasionally legible up to 10°.

Some Conclusions.

These experiments show that the centre of the macula is the most sensitive spot for form and for colour vision in bright light, but as the intensity of the light diminishes the central area in the macula becomes both absolutely and relatively less sensitive to form vision than the area at the periphery of the macula and the adjacent part of the retina. The periphery of the retina appears to be relatively very insensitive to form vision, no matter what the intensity of the illumination may be, or whether the eye be light or dark adapted.

The threshold point of illumination at which the central area begins to lose its supremacy is between 0·003 candle-power and 0·002 candle-power. When the illumination is below 0·002 candle-power the scotoma is increasingly marked and the most sensitive part of the visual field is a signet ring-shaped area surrounding the macula at about an angle of 2° with an extension to 4° at the temporal side. The feebler the illumination the greater is the difficulty in maintaining strict fixation. The eye tends to travel in a small area all round the object it is fixing. This becomes exaggerated into something very like a vertical and even a rotatory nystagmus at times.

The arrangement of the different varieties of cones in the retina may account for the phenomena we have noticed. The following account, by Saltzmann, may be of assistance:—

The central area of the macula contains very slender cones with an inner member 2·5 μ thick, irregularly arranged. These are found nowhere else. They are more slender than the other cones and might be taken for rods were it not for the absence of visual purple. Beyond this area the rods become more and more numerous and the cones wider apart, until some three or four circles of rods intervene between the two cones. This distribution is attained some 4 or 5 mm. from the centre of the fovea and is maintained quite constantly to the periphery. In the most extreme periphery the cones are again relatively increased. The foveal area, about 0·5 mm. in diameter, contains only cones. Towards the border of this area the cones are notably thicker and are arranged in oblique rows.

I am continuing my experiments on this subject, which I hope to elucidate still more fully. I am very much indebted to Dr. A. B. Nutt, for the very valuable assistance he has given me throughout this research, and also to Mr. Thompson, of Messrs. Theodore Hamblin, Ltd., for his valuable assistance with the apparatus.

I have not appended a bibliography. If this is required it will be found in the first report of the Miners' Nystagmus Committee. Some very interesting papers on dark adaptation by Selig Hecht have appeared in the *Journal of General Physiology*.

A NEW DEVELOPMENT IN RADIUM THERAPY.

THE APPLICATION OF THE LATER DISINTEGRATION PRODUCTS OF RADIUM TO THE TREATMENT OF CERTAIN SKIN CONDITIONS.

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AND
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As indicated in a communication to THE LANCET,[1] we have been able to extend the usefulness of radium by employing it at a stage in its disintegration, at which hitherto it has not been applied to medical treatment. The particular radio-elements concerned have not previously been used therapeutically, and a definitely encouraging measure of success has attended their use in certain skin conditions. The discovery will be of special interest to radium institutes and other hospitals possessing radium, as it finds a permanent use for otherwise valueless products, and so extends the range of radium treatment.

It is usual to speak of the therapeutic effects of radium, but the actual element itself is of no value. Only when the radium breaks down do its special powers become apparent. The atoms of radium are constantly changing into other atoms, and a series of radio-elements is thereby brought into being. At each stage of the disintegration energy is evolved, and it is this energy which is employed in medical practice. The energy forms are three in number:—

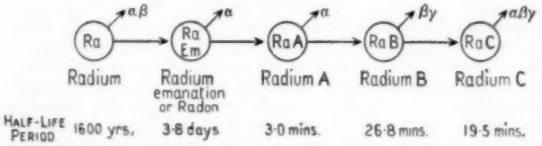
1. *Alpha Rays* (α).—Fast moving atoms of helium.

2. *Beta Rays* (β).—Particles of negative electricity ejected from the disintegrating atom, with high velocities.

3. *Gamma Rays* (γ).—Non-material pulses in the ether, analogous to X rays, but of greater penetrative power.

All three kinds of rays possess definite powers of affecting the development and life of living cells, but the alpha rays have so slight penetration that they

FIG. 1.



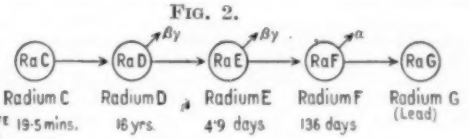
are of little or no therapeutic value, and as usually employed, radium owes its therapeutic powers to the beta and gamma rays. These are evolved during the third and fourth stages of the disintegration as shown in Fig. 1.

Active Deposit of Rapid Change.

The radio-elements shown constitute the active deposit of rapid change and the longevity of the various elements is indicated by the time taken to decline to half. As generally used in medicine, the actual radio-elements employed are radium B and radium C, and the actual rays, the beta and gamma rays of these elements. This is true whether an actual salt of radium is employed, or whether the emanation, the first disintegration product, is used. If a radium salt is used, an equilibrium is established amongst the various products, and owing to the long life of radium, the strength of a radium plaque is, ordinarily speaking, constant. But if a tube of emanation is the source of the activity, the tube gradually loses its strength, according as the emanation declines, and with it the radium B and radium C. Shortly after all the emanation in the tube has disintegrated, there is no radium B or radium C left, and therefore the tube has lost its strength. In radium institutes and hospitals employing emanation such finished emanation tubes have hitherto been of no medical use.

But it is well known that while radium C is the last member of the series to have powerful effects, the series does not end there. The subsequent elements constitute the active deposit of slow change and are shown in Fig. 2.

FIG. 2.



Active Deposit of Slow Change.

It will be observed that radium D and radium E emit both beta and gamma rays, but unlike those from radium B and radium C, these are soft and possess little penetrative power. Hence, although after the decline of radium C in the emanation tubes, radium D and the subsequent elements grow up, the residual activity has not until now been considered of any value, and the finished emanation tubes therefore have been counted waste.

It occurred to one of us, however, that although the rays from radium D and radium E are feeble, yet if these radio-elements were concentrated from the finished emanation tubes, their activity might find use in medical treatment where deep penetration was not necessary, and owing to the long life of radium D, supply a fairly lasting source of radiation. In particular it was thought that such a strong preparation of radium D and radium E in equilibrium might prove of value in the treatment of some superficial skin diseases. This conjecture has proved on investigation to be justified, and encouraging clinical results have been obtained.

Clinical Investigation.

Our choice of suitable cases for investigation was naturally governed by the slight penetrative power of radium D and E. From physical measurements it was estimated that the effective penetration in tissue would be about 3 mm., and therefore we selected localised superficial conditions such as capillary nævi, small cavernous nævi, and chronic patches of lupus erythematosus. Extensive superficial conditions like eczema or psoriasis were ruled out as unsuitable for treatment, since only a very limited area can conveniently be treated by an applicator at a time. Lupus vulgaris, with deep-seated nodules, often beyond 3 mm. in depth, and pearly rodent ulcers likewise, were ruled out for investigation. Owing to the limited penetration of radium D and E all the radiation is absorbed in the tissue being treated, whereas with ordinary radium in skin conditions the rays go far beyond the depth desired.

Method of Treatment.—At first it was thought advisable to work along the lines of making applicators of fairly small intensity and giving long exposures—in keeping with recent technique in certain branches of radium therapy. Therefore most of the clinical tests were made with applicators of such strength as to produce a mild erythematous reaction after 14 days' exposure. Latterly, stronger applicators were made which produced a reaction in seven or eight days; but, as detailed in the account of the chemical work, applicators can easily be made of such strength as would limit the exposure to three days, or indeed less, the required reaction being produced in that time. This is an advantage in treating affected areas of the face, and it is intended that most of the future work will be done with these stronger applicators.

Applicators.—The applicators to contain the active elements were usually of silver or nickel, and of

[1] THE LANCET, Feb. 9th, 1924; see also Nature, Feb. 23rd, 1924.

different sizes and shapes to suit different situations. They were thin enough—generally 0·2 to 0·4 mm.—to permit of slight moulding and adjustment to the skin surface. Most were of an oval shape, from 10 to 12 sq. cm. in area, and had the active matter present as sulphides along with lead (see "Preparation of Applicators" below). In fixing the active powder to the applicator the powder was uniformly distributed over the metal, then moistened with chloroform, and a very thin coating given of a celluloid varnish made up as follows: solution of celluloid in amyl acetate, ½ oz.; acetone, ½ oz.; acetic acid, ½ oz.; acetic ether, ½ oz. The active side of the applicator was covered with a layer of crêpe-de-chine to protect the active matter from contamination and from moisture. The applicator was then fixed over the affected area with zinc plaster, and the patient instructed to keep it perfectly dry.

In every case the applicator was removed after a decided erythematous reaction was produced, and, if necessary, applied to the same area in about four to six weeks time, after all trace of the previous reaction had disappeared. Occasionally slight blistering was produced, necessitating dressing the part with boric ointment. In one case a very marked crusted reaction was produced after 17 days' application. From our experience blistering should be avoided. Good results are likely to be obtained if the applicator is worn only long enough to produce a mild erythematous reaction.

Case Records and Results.

CASE 1.—Miss M., aged 25. Port-wine nævus of the left cheek and chin, colour rather bright red. Five applications were given, but as this was one of the early cases treated the first two were tentative and were not of sufficient duration to produce the required reaction (Figs. 3 and 4). The actual facial appearance is even better than the photograph indicates.

CASE 2.—D. T., girl, aged 7. Extensive and somewhat patchy capillary nævus of right cheek, extending up to and over right eyebrow. The patchy portions were about the size of a threepenny piece, bright red in colour with well-defined spider nævi portions between. The skin on the areas treated became soft and white. Treatment in this case was done slowly and covered a period of two years, and the parents were very pleased with the result.

CASE 3.—Miss H., aged 16. A red capillary nævus of port-wine type over left jaw and cheek. Four applications were made. The condition has responded and shows much improvement, but the result has not been so striking as in the other cases owing to a mild degree of pigmentation resulting. One application in this case was overdone, producing a definite crusted reaction, which may account for the pigmentation.

CASE 4.—Baby L., aged 12 months. A circumscribed nævus of mixed type on abdomen; it had previously ulcerated in the centre, which accounts for a central scar present. The nævus was the size of a two-shilling piece, strawberry red in colour, and elevated above the skin by one-eighth of an inch. After two applications the nævus had completely flattened down and the colour faded to a faint bluish tinge. Slight pigmentation outside the area treated has in this case also followed a somewhat overlong exposure, but this it is expected will gradually disappear.

CASE 5.—Baby R., aged 6 months. A small capillary nævus on point of left shoulder, about size of a shilling, strawberry red colour, elevated above skin by one-sixteenth of an inch or more. With one application there was immediate improvement.

CASE 6.—Miss G., aged 28. Lupus erythematosus. This was an extensive chronic case involving a large area of forehead, nose, and part of one cheek. All precautions had been previously taken to eliminate any source of focal infection; septic tonsils had been removed and decayed teeth extracted many months before, without any apparent change. There was no evidence of tuberculosis. Treatment was confined to the patch on the forehead and to the cheek. Reaction to the treatment was marked, blistering being noticeable. The result is a very marked scarring over the central portions of the lesions, and this scarring has remained for over a year. Difficulty, however, was experienced in arresting the slow spread at the margin. The disease still remains active in parts, but there is apparently a definite arrest with marked scar formation over most of the treated portions.

We consider the results very encouraging. The parents of the infants all expressed themselves as greatly pleased with the results produced, and the adult cases were so satisfied with the improvement that they were most anxious to continue the treatment to include all the affected areas, in spite of the inconvenience of wearing the applicators on the face.

Extraction of Radium D and Radium E.

As the result of some ten years' use of radium emanation by the Glasgow infirmaries and hospitals under the auspices of the Glasgow and West of Scotland Radium Committee, more than a kilogramme of finished emanation tubes of various shapes and sizes had been collected in the laboratory at Glasgow University. These tubes were the source of the radium D and E used in the research. The radium D and radium E, it will be understood, formed a sub-metallic deposit on the inside of the finished emanation tubes. Most of this deposit is soluble in fairly strong hydrochloric or nitric acid, but, possibly owing to the recoil and bombardment which had taken place inside the tubes during the disintegration, the active matter is slightly embedded in the glass and its solution is not easily effected. The following table shows the solvent power of various acids under different conditions.

Solvent Action of Various Acids on Deposit of Radium D and Radium E in Emanation Tubes.

Acid.	Treatment.	Percentage strength dissolved out.
50 % hydrochloric	Boiling for 5 hours.	83·1
	" 10 "	83·4
50 % nitric	" 5 "	82·9
	" 10 "	83·0
Conc. hydrochloric ..	" 5 "	82·9
	" 10 "	83·6
Conc. nitric	" 5 "	83·4
	" 10 "	83·4
Aqua regia	In cold for 3 days.	73·5
	Boiling for 5 hours.	86·8
	" 10 "	88·5
	" 20 "	90·4
	" 40 "	92·4

Aqua regia (4 parts of conc. hydrochloric acid to 1 part conc. nitric acid) is the best solvent to employ, and fairly prolonged boiling is necessary to effect the maximum solution. In none of the extractions was it possible to extract more than 93 per cent. of the activity, as judged by a beta ray electroscope. Experiments were made to determine if this residual 6 or 7 per cent. activity could be removed, and it was found that this could be done by shaking the tubes with dilute hydrofluoric acid, which, of course, would dissolve some of the glass. This showed that some of the active matter is actually in the glass; but the small quantity is not worth the effort required to obtain it.

In extracting, therefore, it is recommended to use aqua regia, and to keep this at boiling point for a day or two on a sand bath. The tubes need only be broken, not powdered. Even on a sand bath very bad "bumping" will be experienced, and it was found necessary to employ a long upright condensing tube with ground-tapered end fitting into the ground end of the flask, and to clamp both firmly.

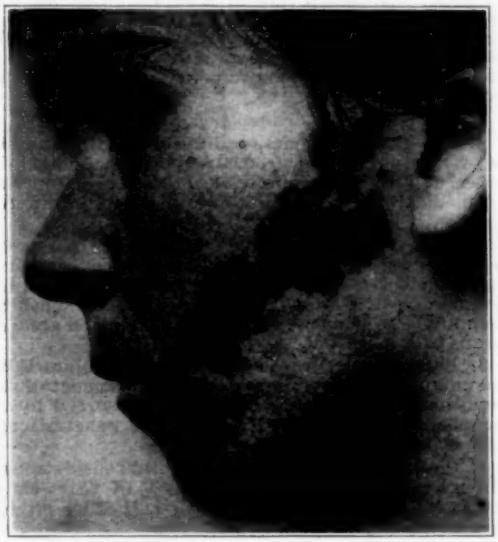
Further Treatment.—The strong acid solution is removed by decanting, and the tubes well washed with hot water, the washings being added to the extract. This is boiled down to quite small bulk, when an extra quantity of concentrated nitric acid is added, after which the solution is evaporated down on a water bath practically to dryness. Depending on the particular kind of applicator desired, as suggested below, this evaporation would be continued to as near dryness as is safely possible, with the subsequent addition of boiling water to any required dilution, or the slight acidity remaining would be neutralised with ammonia before diluting. It will be found convenient to handle about 40 or 50 g. of tubes at a time, and

this quantity may be expected to furnish sufficient activity for four to eight applicators, according to what strength of these is desired.

Preparation of Applicators.

When the active matter is obtained in solution it is necessary to fix it in some way for medical application, since the quantity is so small that it cannot be handled by itself. The most direct way is to associate it with some substance and apply this activated material to the diseased area; but, owing to the screening effect of this substance, some of the strength of the radium D and E is lost. Therefore to make the most powerful applicators, radium D and E must be obtained alone and unassociated. This may be done by taking the acid extract to perfect dryness in a platinum basin over a water bath, and most carefully dissolving off the invisible film with hot water, which gives a neutral solution containing nothing but radium D and E. The quantity of this solution required to give the desired strength may be evaporated, portion by portion, in the actual applicator, and the deposited matter protected by a thin film of collodion. By this method powerful applicators may be obtained, which will produce a reaction after only two or three days' exposure.

FIG. 3.



Port-wine nævus. Before treatment.

FIG. 4.

Same case as Fig. 3. After treatment.

Such applicators have the disadvantage of containing no visible material, and much of the active matter is apt to be worn off without attracting notice. For these reasons it is suggested that the active matter in general should be associated with a quantity of some ordinary substance, so small as not to screen too much of the radiation, and yet sufficiently perceptible to permit safe handling of the applicators.

The methods that have been found successful are: (1) precipitation and adsorption methods; (2) electrolytic methods; (3) replacement methods. In Nos. (1) and (2) the active elements are associated with some finely divided material, and an active powder thereby obtained, which can be fixed with collodion on an applicator tray of suitable size and shape, and this applied to the area to be treated. No. (3) involves the use of a metal plate which thereby becomes the applicator.

1. *Precipitation and Adsorption Methods.*

(*a*) If the original slightly acid solution is evaporated portion by portion on a nickel tray, nickel nitrate is formed containing the active elements, and this can be changed to the dry oxide by heating, or, if the acid solution is neutralised with ammonia and the solution evaporated on the applicator, a deposit of activated ammonium nitrate is obtained.

(*b*) *Sulphides.*—The first attempts made were to precipitate the radio-elements along with lead sulphide by adding a lead salt (e.g., lead nitrate) and precipitating with sulphuretted hydrogen gas, and this method is recommended for the first trials of the new radiation. It takes advantage of the chemical similarity between lead and radium D; radium E, which also forms an insoluble sulphide, is precipitated at the same time. To the extract of, say, 30 g. of tubes, about 0·5 g. of lead nitrate is added, and sulphuretted hydrogen passed through. The quantity of lead nitrate added will be regulated according to the intensity desired, and if required the active powder can be diluted with ordinary lead sulphide. Iron sulphide and mercuric sulphide precipitates may also be used to precipitate the radio-elements, but not copper sulphide. One disadvantage of using salts of the heavy metals is their marked screening effect, and two lighter nuclear substances are therefore suggested.

(*c*) *Ferric Hydroxide.*—Very fine films of ferric hydroxide containing the radio-elements can be prepared by adding a small quantity of ferric chloride to the active solution, precipitating with caustic soda, and drying in oven.

(*d*) *Calcium Carbonate.*—Finely divided precipitated chalk, if shaken up for half an hour with the original acid solution after neutralising with ammonia and boiling off the excess, brings down about 80 per cent. of the activity by adsorption, and makes a clean-looking applicator. (Of course, a calcium solution may be used and sodium carbonate solution added.)

This method has the very marked advantage that if the active powder on the applicator becomes damaged, it is sufficient to immerse it in dilute hydrochloric acid, which puts the activated material into solution again, from which it can be extracted by any of the means suggested.

2. *Electrolytic Methods.*—In the above methods the activated powder is spread on a tray and thus applied, but if the surface to be treated is uneven it is practically impossible to ensure uniform distribution of the active powder. Such uneven sites have arisen in cases of lupus erythematosus involving the nose, or nævus over an eyebrow or chin. In such cases it is most suitable to prepare applicators by electrolysis of the active solution. This suggests itself very naturally too, as a good means of fixing the active matter without employing any other material, and, of course, an even deposit is easily obtained on any shape or size of applicator. Owing to the fact that radium E (similar in chemical properties to bismuth) in acid

solution goes to the cathode, and radium D (similar to lead) in acid solution to the anode, it is not easy to extract both together. Therefore it is suggested that radium D should be plated out alone; from this radium E will grow, and in a month's time equilibrium will be established and a radium D and E deposit obtained, of practically constant strength for several years.

Plating Out of Radium D.—To plate as dioxide in acid solution requires the use of a platinum anode, and therefore it should be plated out as the element in strong caustic soda solution, using as cathode a nickel plate of required shape. To active solution add 10 c.cm. of 0·1 per cent. lead nitrate solution and make up to 150 c.cm. with strong caustic soda solution. Electrolyse for 24 hours at 70° C., using nickel cathode with 2 volts and a very small current, so as to obtain an adherent deposit. This can be protected with collodion or fine gauze if desired. The part of the electrode on which no deposit is wanted may be protected with wax or varnish.

3. *Replacement Methods.*—It remains to mention the extraction by chemical replacement, and this method has the advantage that no material is present to absorb any of the rays; but as a rule replacement methods are unsatisfactory, because while it is easy to deposit radium E on a metal plate by replacement, it is difficult to deposit radium D suitably; and it is radium D, which by its long life is the storehouse of the activity; without its presence radium E quickly declines.

Metals such as zinc and magnesium, which replace radium D from which radium E grows, or radium D and E together are readily affected by skin excretions and are therefore unsuitable as applicators. The only really suitable metal for replacement is nickel. A nickel plate (of the required shape and with the unwanted part protected with wax or varnish), when dipped in or boiled with a solution of radium D and E replaces only radium E, but this practically completely, and a very active plate is produced. But since no radium D is present the deposited activity due to radium E decays to half of its original value in five days to one-quarter in 10 days, to one-eighth in 15 days, and so on. But if the condition to be treated demands only a fairly short exposure the method is quite practicable. Iron also replaces radium E, but, of course, if an iron plate is left in the solution it rusts, and in the rust formed are found not only radium E, but also radium D by adsorption. This rust, of course, is a constant source of radiation and may be employed as in precipitation methods.

Strength of Applicators.

The applicator most commonly used was an oval tray, ½ in. deep and 10 sq. cm. in area, and this caused the erythematous reaction to appear after 14 days' exposure; but it is obviously desirable to have some expression of its strength more definite than this reaction time. Unfortunately there is no convenient way of expressing the quantity of radium D and radium E present in the applicator, and in any case, if a carrier such as lead sulphide is used and the active film is protected with a collodion coating, there is a screening effect and some of the radiation is absorbed. For these reasons it is considered best to specify the strength of the finished applicator by reference to some easily reproducible standard; such as the alpha radiation from a uranium oxide film, as measured by an electroscope. The electroscope used was a beta-ray instrument made of brass, so mounted as to allow the applicator to be placed underneath, and with a screen of 1/10 mm. aluminium inserted in the base of the electroscope. The gold-leaf was 7 in. above the board on which the applicator was placed, and the circular base of the electroscope 4 in. in diameter was 4¼ in. above the board. The uranium oxide tray was, of course, placed inside the electroscope, when its activity was being determined.

The activity of a 14-day applicator 10 sq. cm. in area, when measured through the 7 in. = 18 cm. of air and 1/10 mm. aluminium, was almost *five times* the activity of a circular uranium oxide film 4 cm. in diameter measured in the electroscope. If it is desired to produce the reaction after only three days' exposure over the same area the activity requires to be about 20 times that of the uranium standard.

The actual details of the *electroscope measurements* are:—

Natural leak of electroscope ..	=	19 m. 30 sec.
14-day applicator through 18 cm. of air and 1/10 mm. Al.	=	4 sec.
3 or 4-day applicator through 18 cm. of air and 1/10 mm. Al.	=	1–1²/₅ sec.
4 cm. diam. circular tray of uranium oxide inside electroscope	=	18⁴/₅ sec.

It will be remembered, of course, that it is the intensity that determines the reaction; a tray of 5 sq. cm. area, producing a leak, for example, of 5 seconds, will produce the reaction in seven days, as compared with a 5 seconds applicator over 10 sq. cm. It will also be understood that owing to the great difference in the penetrative quality of the rays emitted by radium D and E and uranium oxide, it is not possible to express one in terms of the other. But by using a standard film of uranium oxide for comparison, as indicated above, it will be possible to prepare applicators of suitable strength, after which the particular electroscope measurements (e.g., divisions of scale per minute per sq. cm.) may be used as standards.

Summary.

1. The radio-elements, radium D and radium E, have been extracted from used radium emanation tubes, and in equilibrium together have been prepared for medical use in the form of applicators of different kinds.

2. Such applicators have been found to exert a beneficial action in the treatment of lupus erythematosus, and of various types of nævi. Conditions like eczema and psoriasis will also respond, but it has not been found convenient to treat large affected areas by means of applicators.

3. The radiation from radium D and radium E has the unique property so far as radium treatment of skin conditions is concerned, that it is all absorbed by the part being treated, since its effective penetration is only about 3 mm. of tissue.

4. Radium D and E applicators retain their strength and may be used for many years; 16 years elapse before the activity declines to one-half of its original value.

The authors desire to express their thanks to the Glasgow and West of Scotland Radium Committee for granting the facilities required in the carrying out of the research. They will be pleased to assist with further information or fuller details on any point if communications are addressed to Mr. McHutchison, Radiometric Laboratory, Glasgow University.

ACUTE DILATATION OF THE STOMACH COMPLICATING ARTIFICIAL PNEUMOTHORAX.

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THIS case is recorded on account of the unusual mode of death of a patient undergoing artificial pneumothorax treatment for pulmonary tuberculosis. The occurrence of acute dilatation of the stomach does not seem to have been previously recorded in this connexion.

A woman, aged 32, was admitted to the Royal Chest Hospital on May 15th, 1923, complaining of malaise and cough of 18 months' duration. There had been loss of flesh since July, 1922. Sputum was scanty, contained tubercle bacilli; no hæmoptysis. The past history was of fair health; "bronchitis" in May, 1922, and "inflammation of the stomach" at the age of 21. There was no family history of tuberculosis.

Condition on Examination.—Very thin and pale; slight brown pigmentation of the face; fingers slightly clubbed. Physical signs in chest: In front. Heart not displaced.

Some limitation of movement of right upper chest, with flattening below and hollowing above the clavicle. Impairment of percussion note over right upper chest down to fourth rib was marked. A patch of bronchial breathing, with bronchophony and whispering pectoriloquy, was present in first intercostal space. There were crepitations down to fourth rib. In back: Impaired percussion note, weakened air entry and crepitations down to the lower angle of the scapula on the right side. At the left apex there were a few crepitations both in front and in the back. Other systems appeared normal.

Treatment.—Absolute rest. Temperature was swinging from normal to 100° F., with occasional rises to 101° or 102°. Pulse range was 100 to 120. Respiration-rate 28 to 40. Occasionally the sputum was slightly blood-stained. The signs in the right lower lobe increased, and signs appeared at the apex of the left lower lobe. In October there seemed to be a definite improvement which continued during November. Towards the end of November the temperature began to swing again and the signs to change. A large area of amphoric breathing, with hyperresonance, appeared at the right apex. In the right lower lobe marked impairment of percussion note with crepitations appeared. X ray examination showed a localised pneumothorax at the right apex, and considerable disease of the right lower lobe. The left lung seemed comparatively clear, and physical signs in this side had receded. Active disease at the right apex was shown by the spontaneous pneumothorax, and in the lower parts of the same lung by the spread of physical signs and the X ray findings.

Artificial pneumothorax was performed on the right side on Dec. 8th. Ten refills were given between Dec. 9th and Jan. 14th. The mean pressure was not raised above plus 2 inches of water, and the largest refill was 500 c.cm. of air. The temperature was markedly reduced by the operation, and the general condition seemed to improve. On Dec. 20th X ray examination showed good collapse of the right lung. On Jan. 10th the patient vomited and complained of some abdominal pain. No abnormal character of the vomit was noted. On the 14th the last refill was given, 400 c.cm. of air giving a final mean pressure of plus 2 inches of water. On the 18th she complained of some dyspnœa and a choking sensation on lying down. There was no further vomiting, thirst, or suppression of urine. On the 20th the dyspnœa became extreme and she died.

Post-mortem Examination (Jan. 21st, 1924).—The body was of a small woman, thin and wasted; the abdominal wall was very tense. Thoracic cavity: Right lung collapsed, leaving a clear space from the thoracic wall of from 4 to 5 inches. No fluid. There were web-like adhesions at the right apex, a tough slender band at the junction of upper and middle lobes, also a mass of adhesions posterior to this. Left lung: Adhesions at the apex, otherwise clear. Abdominal cavity: Enormously distended stomach.

Viscera: Right lung collapsed, not quite airless. Tuberculous cavities: (*a*) three in upper lobe, size of florin; (*b*) one in middle lobe, size of shilling; (*c*) one in lower lobe, 2 inches by 1¼ inches. Left lung engorged; some collapse at the base. No obstruction to bronchus or vessel found. Scars on the surface of upper part of the lower lobe, and at the summit of the apex posteriorly. Tuberculous cavities: (*a*) two in upper lobe, 2 inches by 1 inch; (*b*) one in apex of lower lobe deep to scar. Liver slightly nutmeg. Stomach: Precise measure of capacity not available; estimated at about 8 pints. Mucosa smooth, pyloric orifice not obstructed. Spleen, heart and pericardium, kidneys, duodenum, pancreas, biliary system, intestine, pelvic organs: No abnormality found. Glands: Cervical slightly enlarged. Glands at bifurcation of the trachea, and paratracheal glands greatly enlarged, especially on the right side. These glands were soft on section, but not caseous.

Discussion.

The chief interest of this case lies in the mode of death. As a point of minor interest, it may be remarked that the presence of a spontaneous pneumothorax at the right apex did not prevent effective collapse of the right lung. The condition of acute dilatation of the stomach was first described by Hilton Fagge [1] in 1872. Cases have been recorded since by many observers, of whom Box and Wallace, and Campbell Thomson are conspicuous. Campbell Thomson [2] has collected 44 cases of this condition into a monograph; five of these cases are of his own experience. This writer has attempted a classification on the basis of pathological or clinical associations. Thus groups are defined in which acute dilatation of the stomach has appeared, and usually proved fatal, after gross dietetic errors, after injury, and after surgical operations. It is noteworthy that, in the cases following operations, those in the abdominal area do not constitute a majority. In one group are cases in which no definite pathological lesion was discovered. A fifth group contains cases of acute dilatation of the stomach associated with definite pathological lesion in the abdominal area or elsewhere, or else associated with some clinical condition of ill-health. The state of convalescence, or of debility following prolonged ill-health, seems to precede the condition in a number of cases. Two of the cases in Campbell Thomson's monograph were convalescent, one from scarlet fever and another from a fever undiagnosed.

Box and Wallace [3] describe one case of acute dilatation of the stomach associated with diabetic coma. In the youngest case described, a child of 3 years, fatty degeneration of the heart, found post mortem, implies former ill-health. Dietetic error was also a factor. Pregnancy occurs once in Campbell Thomson's collection, and has been described in like connexion by the same observer elsewhere.[4]

Cases Recorded in Connexion with Intrathoracic Disease.

Campbell Thomson quotes one case of empyema, one of abscess of the lung, and three of pleurisy with pneumonia. In one case with abscess of the lower jaw purulent pericarditis was found post mortem. Battle [5] records a case associated with pleurisy and pneumonia. H. H. Brown [6] has described a case in which acute dilatation of the stomach terminated rheumatism and chorea. Mitral endocarditis was found post mortem. Box and Wallace [3] describe two post-operative cases in which acute dilatation supervened. In one was found tuberculosis of both lungs, and in the other suppurative pericarditis in association with osteoperiostitis of the femur.

It is impossible to estimate the proportion of cases in which intrathoracic disease precedes acute dilatation of the stomach. An incomplete survey of the literature, which included Campbell Thomson's book, and the cases recorded in THE LANCET between 1900 and 1924, revealed 60 cases. Intrathoracic disease occurred ten times, the conditions recorded were: Empyema, abscess of the lung, tuberculosis of the lung, endocarditis of each one case; purulent pericarditis, two cases; pleurisy with pneumonia, four cases. Campbell Thomson refers five cases to dietetic excess and four to injury. In two of these cases only was the injury abdominal. In seven cases no other pathological lesion was found. The cases with the associations of these three groups were found in Campbell Thomson's book; no other cases of the same sort were found in the literature examined. The post-operative group seems to be the largest; 19 cases out of 60 belong here. Of these, operations in the abdominal area accounted for nine. Several recoveries have been noted, but the condition has usually proved fatal, and has frequently been undiagnosed until autopsy, as was the case described in this paper.

In 37 cases the day of death after the onset of symptoms apparently attributable to acute dilatation of the stomach has been noted. Thus: First day, 7 deaths; second, 13; third, 8; fourth, 4; fifth, 4; sixth, 1. Occasionally the acute dilatation has seemed to exist with remissions for as long as 11 days prior to death. The case here described died on what was apparently the third day.

Attention is directed to the fact that intrathoracic disease accounts for a considerable proportion of cases of acute dilatation of the stomach. This proportion seems to be about half as many as the cases preceded by operation, but greater than those precipitated by injury, dietetic excess per se, or those without discoverable causation.

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THE CENTRAL NERVOUS DISTURBANCE MANIFESTED BY AN EPILEPTIC FIT.

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SINCE the experiments of Ferrier and the clinical studies of Hughlings Jackson, it has been considered that the epileptic fit resulted from a stimulation of the cerebral cortex; that there was on the brain surface of every sufferer from fits a hyper-excitable area in which an abnormal stimulus originated, and from which it rapidly spread over the whole cortex, causing a sudden discharge of all the cortical cells; that the movements of the convulsion were the effect of the discharge of the motor cortical cells, while the "aura" (if any) indicated the site of the hyper-irritable focus in which the stimulus arose. These views of Hughlings Jackson still dominate all writings on the nature of epilepsy. Gowers, though he accepted Hughlings Jackson's views, considered also the possibility that the fit was brought about by inhibition of the brain cortex, and this view has, I understand, been put forward recently in France by Hartenberg. If, therefore, we endeavour to form any clear idea of the main symptom of epilepsy we must examine the elements of the fit in their relation to these two theories.

Neglecting for a moment *petit mal*, fits may be full or partial (Jacksonian); but since the Jacksonian fit hardly ever occurs in idiopathic epilepsy, it is only with the former kind of convulsion that we are now directly concerned.

The Full Fit.—The epileptic attack has been often and minutely described. In its typical form it consists of two stages, the tonic and the clonic, to which may be added in certain patients a short preliminary stage, the "aura," and a post-epileptic stage of unconscious action, well called "automatism."

In a number of patients the approach of fits is indicated to the relatives or even to the patients themselves by certain prodromal symptoms—usually of a psychical nature. They consist of an apathy, a mental dullness, a loss of memory, sometimes a decrease of those qualities which we class as "refinement." These mental changes appear to indicate a decrease of the normal cortical activity or control. There is never a state of elation or "flight of ideas" or an increase of mental power such as we might expect from commencing excitation of the psychical cortex. It may, in fact, be taken as a general rule that an epileptic will not have a fit during a period of intense mental activity or of enthusiasm. The prodroma rather favour the theory of cortical inhibition.

Loss of consciousness is an essential element of the true epileptic fit; it is difficult to reconcile it with the theory of cortical excitatition, but of the theory of cortical inhibition it is an essential part.

In most patients the fit begins with the so-called "tonic" stage; with a complete loss of consciousness, all the muscles of the face and limbs and trunk are thrown into tonic rigidity. It has been shown by Cobb from electromyograms of convulsed animals that this rigidity of the muscles is due to a tetanus and not to an excess of postural tone such as causes the stiffness of hemiplegia and other spastic states. The "tonic" (i.e., tetanic) stage of a convulsion may be produced in an animal by strong electrical stimulation of the cerebral cortex. But, on the other hand, fits with the "tonic" stage as their major part may occur in very young infants in whom the pyramidal tracts are still unmyelinated and whose motor cortex is, for that reason, presumably functionless; there is nothing to suggest that the mechanism of the seizure is different later in life, and so we must suppose that this portion of the fit is, as in the infant, independent of the motor cortex.

The next and usually longer stage of the fit, the clonic stage, involves movements which, though subject to some individual variation, are very constant in type. They consist in rapid flexion and extension at the elbows, wrists (less), and fingers, and, in the lower limbs, of large flexion and extension movements occurring alternately in the limbs so that one lower limb is in extension while the other is in flexion; there are in addition upward and downward movements of the lower jaw, clonic retraction of the cheek, and in many cases contraction of the vesical and sometimes rectal musculature. All these movements are at first strongly damped by the tetanus of the muscles involved and their amplitude increases greatly as that condition passes off. Similar movements can be elicited by electrical stimulation of the cerebral cortex, and it was because of this fact that Jackson's theory of convulsions gained general acceptance. Another explanation of the movements of the clonic stage based on later work may, however, be presented. The movements of the limbs are exactly those which can be produced by spinal reflexes. The movement which the legs repeat—withdrawal of the one and extension of the other—represents the full response to stimulation of the sole of the foot in a paraplegic subject or in a decerebrate animal, what Sherrington has called the "walking" reflex. This reflex can only be elicited when the cortical control over the spinal centres is removed. The movements of the arms, if they reach their full amplitude, show not only flexion and extension but also, with the extension of elbow and wrist, an element of hyper-pronation or inversion of the forearm and hand, and correspond closely with those (first described by Buzzard and Riddoch) which result from painful stimulation of the axilla in cases of quadriplegia and some cases of hemiplegia. These latter are brought about by a spinal reflex and are only demonstrable when the cortical control of the arm centres in the spinal cord is cut off. The movements of the limbs which the clonic stage of the fit exhibits are therefore capable of being produced by centres which exist in the spinal cord. No reflex has to my knowledge been described provoking the masticatory movements of the jaws and the retraction of the cheeks which occur in the fit; but these elemental movements are present in animals deprived of their cerebral cortex and almost certainly represent a function of the medulla oblongata. It is, consequently, unnecessary, that in order to explain the clonic stage of the fit, we should invoke cortical activity.

If the plantar reflex be tested immediately after a fit it is usually of the extensor type—a further indication that cortical motor control is in abeyance. It has been suggested that this is due to exhaustion of the cortical cells as a result of their discharge, but the fact that a second and equally strong fit may occur within a few minutes seems to me to preclude that explanation; so quick a recovery of the cortical cells is unlikely, and it is much simpler to regard the extensor plantar response as merely one sign of an absence of cortical function which obtains throughout the fit.

The aura which occurs in a small proportion of patients was regarded by Hughlings Jackson as an indication of the area of the cortex in which the excitation began. But it is hardly likely that simple subjective phenomena such as flashes of light or noises in the ears are cortical in origin. There are, however, in a few patients, auræ, particularly visual auræ, of a highly developed kind. One of my patients always at the beginning of a fit sees a brick wall which heaves towards and away from him, coming nearer at each heave till at last it strikes him, and as it does so he loses consciousness. Such phenomena are probably allied to dreams; in any case it is difficult, in the face of other evidence, to accept them as any proof of cortical over-activity.

Post-epileptic "automatism" presumably represents an imperfect recovery from the fit, the motor functions having recovered and the psychic being still partially in abeyance. We may suppose either that the psychic cortex is still affected by a primary inhibiting influence or that it is suffering from exhaustion. If the former be the correct explanation, the mental state is possibly

similar to that of a dream, and "automatism" in many ways on a parallel with somnambulism.

These are all the elements of the fit, but another point that must be referred to is the constancy of the seizure. Though there are some variations, the elements of the attack are the same and their sequence is the same in nearly all cases. To such a degree is this true that provided there are no signs of organic nervous disease we base our diagnosis almost entirely on the description or observation of the fit. I have already referred to the constancy of the composing elements—the "tonic" stage and the stereotyped movements of the clonic stage. Constancy of sequence is found not only in the main divisions of the convulsion but even in small details; though the epileptic's hand may take up its posture in a moment at the onset of the fit, yet the thumb is always turned into the palm and the fingers closed over it. If the seizure were the consequence of cortical stimulation the movements would seldom occur in the same order in any two patients; their sequence would depend on the direction from which the stimulus approached the motor cortical area and the direction in which it spread over it, and no small movements such as those of the thumb and fingers could be so uniform in their order of occurrence as to produce a sign of value for differential diagnosis.

Thus in analysing the full epileptic fit I have not found any unequivocal evidence of cortical stimulation, but, on the contrary, in the prodromal symptoms, in the unconsciousness, and in the presence of an extensor plantar response at the end of the clonic stage I see indications of cortical inhibition; the movements of the clonic stage may be explained either by cortical or by brain-stem and spinal action, but the latter explanation is much more in accordance with the other elements of the fit.

I have not overlooked the fact that movements similar to those of a fit are caused by experimental stimulation of the brain surface. We must remember that in such experiments the cortical motor cells merely pass on the stimulus to the spinal and brain-stem cells, which are the true motor cells; and generalised convulsions with the same tonic and clonic stages can be produced in animals in which the cerebral hemispheres have been separated from the brain-stem and cord. Their occurrence in infants has already been mentioned.

Petit Mal.—A large proportion of epileptics suffer from minor as well as major attacks. The former usually consists of a momentary unconsciousness, interruption of speech, and loss of the continuity of thought, in many cases the patient suddenly falls down but is able to rise again at once. These phenomena we cannot interpret as evidence of cortical stimulation, but rather of inhibition, of the speech, psychical and motor functions of the brain.

Conclusion.—We are forced to the conclusion that the essential central nervous disturbance produced by true (idiopathic) epilepsy is an inhibition of the cortical function and that in the major seizure this is accompanied by an uncontrolled discharge of centres in the brain-stem and spinal cord.

A NOTE ON THE PARTIAL FIT.

The partial (Jacksonian) fit is very rarely, if ever, a manifestation of idiopathic epilepsy, but indicates a localised lesion of the brain and is therefore better called "focal" or "epileptiform." I only mention it here because it may be considered to have a bearing in the causation of the full fit.

In the partial fit there is no loss of consciousness, so that the chief indication of cortical inhibition is absent, and we must be guided by other features. (1) When in association with a Jacksonian fit—say an attack of convulsive movements of the right hand—speech is affected, it is always in the direction of a loss of function; usually the patient becomes either quite unable to speak or unable to produce exactly those words which he wishes to use, both during the attack and for several minutes afterwards. (2) The movements of the partial fit are the same flexion and extension movements of the fingers or other parts that occur in the full epileptic fit; they are not complex or highly integrated movements such as we might expect from cortical activity; by the nature of the movements the attack declares itself as part of a full fit. (3) The conditions which produce such attacks are cerebral tumour (including abscess, gumma or tuberculoma), infantile hemiplegia, meningitis, and many other conditions in which the cerebral cortex is damaged. In practically all such conditions localised destruction of the brain is present. This is especially noticeable in infantile hemiplegia, a disease in which the motor cortex of the affected side is functionless, and at post-mortem examination shows atrophic sclerosis or porencephaly. Yet in such cases the fits may be confined to the limbs corresponding to that side of the brain.

There are thus indications that the partial fit occurs when the function of a circumscribed area of cerebral cortex is impaired. It is quite evidently not due to any increase of the normal function of the cells of the affected area, but whether it is in any way dependent on abnormal stimuli transmitted to the impaired cells and conducted by their fibres to the lower centres, or is merely an escape of the lower centres from cortical control, cannot yet be decided.

PNEUMOCOCCAL MENINGITIS.

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OWING to the comparative rarity of recovery in pneumococcal meningitis it may be of interest to record the following case, which was under my care and that of Mr. Seton Pringle.

A boy, aged 16, was admitted to hospital on Dec. 19th, 1924. He had received a kick from a horse 12 hours previously. There was a depressed fracture on the left side of the bridge of the nose, and an incised wound two inches long above the right ear.

Condition on Admission.—The boy was in a collapsed state, complained of severe headache, and could not see with the left eye; pulse, 60; temperature, 98·8° F.; respiration, 26. The knee-jerks and Achilles jerks were absent. The following day he was in an excited condition, uttering loud cries and shrieks even when undisturbed; the head was retracted, Kernig's sign present, extensor plantar reflex in right foot; temperature, 102°; pulse, 90. A lumbar puncture was performed on Dec. 21st, and 20 c.cm. of very turbid fluid under tension removed. The fluid on standing gave a very copious deposit of pus, and on culture Prof. J. W. Bigger obtained a pure growth of pneumococcus, Group IV. For some days the boy remained in a heavy sleepy condition, with a spiky temperature rising to 103°; pulse, 90 to 100. Then the condition gradually improved, the temperature reached normal on Jan. 11th, 1925, all stiffness of neck and Kernig's sign had disappeared by Feb. 6th, and the knee-jerks were present but feeble. The pulse was rapid (90 to 100) until Feb. 20th when it became normal. On March 6th the boy left hospital feeling perfectly well, the only abnormalities being the depressed fracture of the nose, feeble knee-jerks, and slight defect of vision of the left eye due to several now healed chorioidal ruptures. When last heard of, some months afterwards, he was in excellent health.

Treatment consisted in lumbar puncture repeated at intervals of three or four days, 20 to 40 c.cm. being removed at a time. Five punctures in all were done, the last specimen of fluid being perfectly clear, but still under somewhat increased tension. Hypodermic injections of an autogenous pneumococcal vaccine were also given. There was a marked improvement after each lumbar puncture, and usually a fall in temperature after each injection of vaccine. In this case infection had evidently occurred from the nasal cavities owing to fracture of the cribriform plate.

The first case of recovery in pneumococcal meningitis was reported by Jemma[1] in 1896. In a general review of the prognosis of pneumococcal meningitis by Rolly[2] in 1911 he recorded four cases of recovery

[1] Baumgarten's Jahresberichte, 1896.
[2] Deutsch. Med. Wochenschrift, 1911, p. 774.

out of 30 cases which came under his care. He states that up to that time only seven cases of recovery had been recorded. Two of his cases of recovery occurred in young adults and two in children. In all four cases there was coexistent lobar pneumonia, and the cerebro-spinal fluid contained a large amount of pus and numerous pneumococci. He treated all by repeated lumbar puncture; in one case—a child aged 2¾ years—he performed no less than 16 punctures and withdrew a total of 600 c.cm. of fluid. In a more recent publication[3] statistics are given of 7 per cent. recoveries in a series of 42 cases, and in another series there were 10 per cent. recoveries in 60 cases. Numerous other cases of recovery have been reported in the last few years. In some of these repeated lumbar puncture was the only treatment, in others serum was given in addition, whilst in others again fixation abscess was employed in addition to lumbar puncture and serum. Recovery may take place whether the patient is an adult or a child, whether the meningitis is serous or purulent, whether infection of the meninges is associated with pneumococcal infection of the lungs, or whether it is secondary to fractures of the skull with resulting infection from the nasal cavities, or whether it is a sequel to suppuration in the middle ear or accessory nasal sinuses.

It is significant that in the case which I record the pneumococcus belonged to Group IV., though I have seen a fatal case in which the pneumococcus was also Group IV. The reported cases of recovery do not state the type of pneumococcus sufficiently often to enable one to draw any conclusion as to whether the type influences the prognosis materially.

Résumé.—1. A case of meningitis due to pneumococcus, Group IV., with recovery, is reported. 2. In pneumococcal meningitis recovery occurs in 10 per cent. of cases. 3. The essential treatment is repeated lumbar puncture.

[3] Bull. de la Soc. Méd. des Hôpit. de Paris, 1923, pp. 729, 768.

Medical Societies.

MEDICAL SOCIETY FOR THE STUDY OF VENEREAL DISEASES.

A MEETING of this Society was held on March 26th, Dr. WILFRID FOX, the President, occupying the chair, when a discussion on

MARRIAGE AND SYPHILIS

was opened by Dr. G. RIDDOCH. In agreeing to open the debate, said Dr. Riddoch, he felt he was in a false position, as he was profoundly ignorant on the question of the infectivity of syphilis for, as a neurologist, he saw only the late effects, the tragedies. He would therefore use the opportunity to stir up a few warnings against giving too optimistic a forecast in the early stages of the disease. A perusal of the literature seemed to indicate that it was a subject on which no one was very well informed, yet it was of the first importance. There was now available much more precise information by which to answer the question so often put to the medical man by patients distressed in this way; at the present time it was a matter more for discussion than for dogmatic statement.

The first question was: How long, and under what circumstances, was syphilis infectious? It was agreed that in the primary and the early secondary stages—i.e., when the chancre was present and when cutaneous lesions appeared—the infectivity of the disease was very high; spirochætes were present in the semen and other secretions. It was when the later phases of the disease were considered that difficulties arose. The infectivity tended to diminish as the disease progressed, though not in a steady way; there seemed to be re-animations as shown in fluctuations in virility. Decision was difficult when the cutaneous lesions had disappeared and latent syphilis was present, the only manifestation being a positive Wassermann. When that was the case and the primary infection had taken place five or six years earlier, what was the infectivity? Clinical and experimental evidence seemed to show that infectivity was still present at this stage. In rabbits experimentally treated at such a stage the intra-testicular secretions and the blood were positive. Certainly spirochætes tended to persist for a considerable time in healed chancres, and monkeys could be infected with syphilis by injecting material from chancres which had healed 14 months, even though local and general antisyphilitic measures had been adopted. It was not known in what proportion the disease was infectious at this stage. What was the position when the Wassermann was negative? Could it be said that at this stage infection could not occur? He did not think so, especially when the Wassermann had previously been positive. Men who had so-called latent syphilis and, having been assured it was safe to marry had done so, had infected their wives, and the latter had borne syphilitic children. It was very desirable to know in what proportion of cases such an accident was liable to occur. In the late stage of latent syphilis—i.e., in the first four or five years after the infection, with or without treatment, and the Wassermann positive but without clinical manifestations—could it be definitely stated that there was no liability to the man, if he married, transmitting the disease to the offspring? He thought not, for the positive Wassermann showed that organisms of syphilis were still present in the body, possibly shut off in a gumma or otherwise isolated, but liable to be liberated into the system. Of six men infected three to six years previously who married while having latent syphilis, five of the wives developed a positive Wassermann, and four of them bore syphilitic children. To what extent were these exceptional occurrences? Clearly those cases constituted a warning. Were cases who admittedly had had a chancre, but whose Wassermann had remained negative for some time, free from infectivity? He did not know, and had not been able to find evidence that there was definite information on the point. There remained to be considered those late cases of syphilis with clinical signs, cases which were often seen because of neuro-syphilis. Were these cases, even with a negative Wassermann, certainly non-infectious? When a patient had got tabes or aortitis, or a gumma of the liver, he did not know whether infection was possible, but thought probably not.

In regard to infectivity, he thought the case of the woman was somewhat different from that of the man, especially in regard to syphilis in the secondary stage before treatment, for with her the danger of infection was greater than in the male. Colonel Harrison's view, with which he was in general agreement, was that the patient should be required to wait four years before considering marriage, and that this period could be shortened by treatment, if it were efficient and thorough, and that before suspending treatment the blood and cerebro-spinal fluid should be Wassermann-negative. Afterwards there should be an examination every month for a year, and a week after a provocative dose of N.A.B.; also at the end of another six months and after a year following a provocative dose. Coming well out of that ordeal seemed to justify marriage, but the speaker thought it might not be safe even then, unless the case had been caught early and the treatment commenced forthwith. Abrahams considered that if the cerebro-spinal fluid was positive, even without nervous signs, in the third year, the patient was a possible candidate for neuro-syphilis later on. That statement was made without much supporting evidence, but the question of how risky marriage would be in such a case was one well worth consideration. Another authority considered that a negative clinical and serological examination after seven years meant that the patient was reasonably safe, but that

even then some cases showed there were exceptions. Prosser White considered that in the tertiary stage the local lesions were non-infectious, but the speaker had his doubts as to that. The question appeared to be even more difficult in the case of women, who seemed much more likely to pass the disease on to their progeny. One authority declared that a woman whose blood gave a positive Wassermann should never marry. Dr. Panton would probably say what was the significance of the Wassermann reaction, because in this matter the pathologist was a very important person. Often one saw patients who had been efficiently treated without showing clinical manifestations, or in whom, accidentally, the Wassermann was found to be positive. What was the infectivity here? He always felt unsafe about such cases. And could a man who had had a positive Wassermann but was now negative be pronounced cured and free from infection? The danger was that he was liable to become positive later on.

It was not sufficient, said Dr. Riddoch, to be able to answer the patient's question as to whether or not he was infectious and liable to transmit the disease; there was the further question whether the disease was likely to incapacitate him as a wage-earner later on, say 15 years hence. It was a difficult problem, but he knew of cases in which a favourable answer had been given by the medical man with disastrous consequences. In forming an opinion he stressed a thorough clinical examination of the patient, mentioning the case of a man aged 35 who had a chancre 12 years previously. He had mercury treatment—not very efficiently—and six years later had N.A.B. injections, and three years prior to marriage had N.A.B., mercury and iodide of potassium. But his blood was Wassermann-positive. Three separate syphilologists assured him it was safe for him to marry. Three months after marriage the speaker saw him and found him the subject of marked tabes, and the history showed that for years he had had lightning pains and had a habit of wetting the bed, this in addition to the pupillary and other classical signs of the disease. His view was that a positive Wassermann indicated the presence still of active spirochætes in the body, hence the prognosis given in such cases should be cautious. A great safeguard against error was not to be content with a single Wassermann test. A smaller proportion would show a negative Wassermann in the spinal fluid than in the blood. On the other hand, an ultra-cautious attitude was liable to breed syphilophobia. Stated in a broad way, his own feeling was that if a man had had syphilis and it had become generalised he ought to have treatment for the remainder of his life, otherwise he could not be said to be free from infectivity nor from the risk of remote complications. A more lenient view was justifiable in the case of a man who had never had a positive Wassermann in either the blood or the cerebro-spinal fluid. Finally, Dr. Riddoch raised the question of the fate of the offspring of syphilitic parents who were supposed to have been cured before marriage; also as to the treatment which could be considered safe and efficient to ensure that the patient would not develop later sequelæ.

The Pathological Aspect.

Dr. P. N. PANTON said he could do little more than propound questions to which he was unable to find the answers. First, could it ever be said that a person who had had syphilis was cured? The information given by the blood Wassermann was insufficient evidence of cure, for that reaction might be negative for a time and then revert to positive. He did not think there existed any method by which it could be said that a person who had had the disease was certainly cured, though a possible exception was the patient with a chancre and a negative Wassermann who was strenuously treated from the first, coupled with—what he regarded as very important—complete abstinence from alcohol. It was very important to know whether syphilis in the tertiary stage was infective. Sir Jonathan Hutchinson considered it was not, and there was much evidence that tertiary syphilitics did not infect their partners. Since the introduction of the Wassermann test, however, there seemed good reason to doubt that statement, and it now seemed certain that infection could be spread in the tertiary stage. A further question was as to what percentage of latent syphilitics subsequently developed lesions. He was not aware of any figures on this matter. His definite view was that no one with tertiary manifestations ought to marry, both on the grounds of infectivity and of subsequent disability. Even cases of latent syphilis without manifestations risked something by marrying. He would have thought that by now the venereal clinics could have supplied the material to enable this point to be settled.

The physician, said Dr. Panton, was apt to regard the Wassermann reaction wrongly from two or three points of view. He was inclined to regard it as infallible, but everyone was liable to err, and, for safety, the test should be repeated. And mistakes were made in reading or interpreting the result of the test, for it was not a question of it being simply positive or negative, especially in cases in which it was between positive and negative. In a given case of the kind one pathologist would return a feeble negative, another a feeble positive, the reaction being the same. No one would nowadays say a case was cured because of a negative blood, or even spinal fluid negative, for at any time it might revert to positive; moreover, an open, progressive, syphilitic lesion might give a negative Wassermann, both in the blood and the cerebro-spinal fluid. It seemed that certain people did not have a reaction and produce anti-bodies. He asked what was the longest time during which the Wassermann had remained negative and then become positive. The longest time he had seen that was less than two years. A frankly positive Wassermann, he thought, could be confidently taken to mean that active spirochætes still existed somewhere in the body, and no such person could be advised to marry. He did not think the pathologist was the right person to answer the inquirer's question as to marriage, and certainly the dermatologist was not. His practice was to send such inquirers to the general physician for a thorough overhaul.

Discussion.

The PRESIDENT agreed as to the intermittent character of syphilis. To some of the questions which had been propounded he thought there never would be an answer, as so much dependence had to be placed on what was told by the patient. And who could say that it was always the husband to whom a wife owed her infection? He believed it was true in the main that four years after the primary disease it was rare for a man to give the disease to his wife. And yet a case was known in which that occurred 18 years after the chancre. The greatest help in these matters could be given by the general practitioner, for to him the vast majority of cases went in the first place, and he kept in touch with the family happenings. Some patients lost their immunity and became infected again.

Captain F. C. DOBLE considered that too pessimistic an attitude led to a condition which was worse than the disease—namely, syphilophobia, which sometimes eventuated in suicide. Syphilis was worse in a woman than in a man, and every woman who had had syphilis at any time should resume treatment as soon as she became pregnant. He agreed that a very important consideration was whether the syphilitic husband was likely to be an encumbrance to his wife.

Dr. B. B. SHARPE said he was now more pessimistic about the disease than before he heard the two opening addresses. He knew of cases in which syphilis had been transmitted to the second and third generation. It was easier cured in the third generation than in the second. In doubtful cases in which advice was sought, the man should be required to consult the woman, and if she cared to take the risk, no objection should be taken.

Colonel E. G. FFRENCH considered the problem was really one of treatment. If a primary case had been adequately treated for years, permission to marry could safely be given, he thought. In a case in which the disease was in the secondary stage before treatment was commenced, there should be an interval of four or five years. If a man had, at consultation, a positive Wassermann, he should not be given permission to marry for seven to ten years.

Colonel L. W. HARRISON said there were cases in which the disease had been transmitted many more years than five after the primary chancre, but he had not personally known one. He thought a man might safely marry if he had been well treated, if five years had elapsed, and his cerebro-spinal fluid had remained Wassermann-negative two years. He looked upon a man with a positive Wassermann as a candidate for disabilities later which would probably incapacitate him. He considered that a patient under the influence of treatment was very unlikely to transmit the disease, as the spirochætes would not be allowed to get into the semen. Certainly a woman who had been syphilitic should have treatment at each pregnancy, on account of the great intimacy between mother and child.

Dr. MARGARET RORKE quoted two cases in which syphilitic children were born, the parents of whom were said never to have had syphilis, but she found they were tabetics. She agreed as to the need of a guarded prognosis, and also that a woman who had had syphilis, however long ago, should have treatment at every pregnancy.

Reply.

Dr. RIDDOCH, in reply, defended his pessimism, and said he thought that, generally, there was too much complacency about the whole matter. He had hopes that many of the questions propounded could be answered, especially as syphilis was nowadays more freely owned to and talked about. At the London Hospital there was a mass of information on the subject awaiting analysis and summarisation which would give valuable data when dealt with.

Dr. PANTON also briefly replied. He said the Wassermann was not an evidence of immunity. He had had very little success with provocative doses in the serum reactions.

ROYAL ACADEMY OF MEDICINE IN IRELAND.

SECTION OF OBSTETRICS.

AT a meeting of this Section held on March 12th Dr. D. G. MADILL, the President, took the chair, and Dr. BETHEL SOLOMONS and Sir JOHN LUMSDEN read a short communication on

An Unusual Case of Pyrexia.

The patient, aged 22, had first been seen by Sir John Lumsden suffering from general debility with pyrexia. There had been an influenzal form of attack from which she had recovered. Her symptoms suggested enteric fever, but tests for typhoid and paratyphoid A and B were negative. Sleep was indifferent. For six weeks there was some rise of temperature, the lowest record being 98·8° F. and the highest 102·8°. As no definite cause of the pyrexia could be established, Dr. Solomons examined her recto-abdominally. Finding some fullness in each lateral fornix, he advised vagino-abdominal examination under anæsthesia. The finding then was the same and a diagnosis of tuberculous salpingitis was made.

The blood examination was as follows: Leucocytes, 38,000 per c.mm. Differential count: Polymorphonuclears, 53 per cent.; lymphocytes, 33 per cent.; eosinophils, 7 per cent.; transitional, 7 per cent.

When the abdomen was opened the tubes were found to be slightly thickened and larger than normal, with closed fimbriated ends. Tubercles were not present. It was decided to remove the tubes, which were taken away in their entirety. The ovaries were bound up with them, but it was possible to spare a small portion of the left ovary. After 16 days the pyrexia subsided and the temperature remained normal. The microscopic examination made the diagnosis evident, the submucosa being packed with giant cells.

Two months later the patient again became ill and consulted Dr. F. C. Purser, who diagnosed encephalitis lethargica. She had in addition an attack of diphtheria, to which she ultimately succumbed.

Sir JOHN LUMSDEN said that this was an interesting and puzzling case.

When he first saw the patient she gave a history of having been ill for some weeks and of having had an attack about a month previously of what would appear to have been influenza, though her doctor had called it food poisoning. He personally thought that it was an attack of gastric influenza. Her pulse was 100, her tongue was furred, and the apex beat was a little bit out; and he thought that possibly there was a certain amount of myocarditis.

The patient went away, but a few days later returned, and he put her to bed in hospital. Her tongue was still furred; she was febrile, rather constipated, and hard to feed. A blood culture and a Widal test were both negative. There were at that time no symptoms whatsoever of encephalitis lethargica. He suspected, however, that there was some tuberculous focus, although there was absolutely nothing to be made out in the lungs. The epigastrium was tender, and there was nausea if food was pushed at all, which made him think that there was something wrong in the abdomen. Dr. Abrahamson then saw the case with him, and they came to the conclusion that it was a case of tuberculous peritonitis, but asked Dr. Solomons to see her. Dr. Solomons saw her, and operated; after the operation she remained febrile for about 14 days, but then her temperature came down. During convalescence she became rather emotional, but improved enough to be sent to the country. Some time later Dr. Purser saw her, as he (Sir John Lumsden) was away, and Dr. Purser diagnosed encephalitis lethargica. It was, of course, just possible that the girl had had encephalitis lethargica all through, but he did not think it probable. She then developed diphtheria and died.

Dr. L. CASSIDY asked how the diagnosis in this case had been arrived at. If tuberculous salpingitis was to be taken as a reason for the state the tubes were found in, it seemed to him rather an extraordinary procedure to mutilate a young unmarried girl on evidence which to him seemed insufficient. Even the microscopical description of the tubes did not seem to him sufficient to account for the clinical symptoms in the case as described by Dr. Solomons and Sir John Lumsden. He, personally, would have thought that the condition was due either to tuberculous meningitis or encephalitis lethargica. He felt that in cases of this kind the wisdom of applying either radium or X rays should always be considered. During the last few years he had seen about 30 such cases and with two exceptions had always found that good results followed treatment by radium or X rays. The symptoms in this case, he thought, largely pointed to a condition of tuberculosis, possibly in the upper abdomen, but not to a condition which would justify removal of the tubes.

Dr. L. ABRAHAMSON said that certainly when he saw her there was no sign of either meningitis or encephalitis, and he did not think that when Dr. Purser saw her she had meningitis, as the cerebro-spinal fluid was not under tension, and he had never seen a case of tuberculous meningitis in which the cerebro-spinal fluid was not under tension. Encephalitis lethargica was sometimes hard to diagnose, but when this patient was seen by Dr. Purser the symptoms were apparently so typical that the diagnosis was obvious. When he (Dr. Abrahamson) saw her she was suffering from pyrexia and her symptoms were all due to this. The only symptom that she had, however, was vague abdominal pain. No evidence of tuberculosis could be found either in the chest or in the abdomen. When the contents of the tubes were cultured for tubercle bacilli the result was negative, but tubercle bacilli were found in sections. No naked eye tubercles could be seen, but microscopically they were easily seen. He thought that removal of the tubes in this case was absolutely justified, and that the result was satisfactory, and he believed that but for the development of encephalitis lethargica the patient would have lived. She died from an intercurrent disease which had nothing to do with the original complaint. The result of X ray treatment in these cases was that there was no internal secretion

of the ovaries, whereas in this case, after operation, a little ovary had been left.

Dr. GIBBON FITZGIBBON said that the question whether active tuberculous tubes should be removed was a much discussed one; he, personally, always took them away in cases in which there was evidence of advancing active disease. If the tubes were not removed the patient was left with a disease. Removal could not leave the patient more sterile than she was before, because tuberculous tubes were functionally useless.

Prof. R. J. ROWLETTE drew attention to the high blood count in this case, which at the time the count was taken was apparently one of tuberculosis. He thought that this was possible evidence of an extreme degree of purely tuberculous toxæmia. Nowadays pyrexia was regarded as a symptom not of tuberculous toxæmia, but of septic toxæmia; but in this case it was proved to be a symptom of tuberculous toxæmia. A curious feature of the case was that diphtheria occurred when encephalitis lethargica was also present. He thought it possible that tuberculin might have done the girl good, but it had been necessary to open the abdomen to see what disease was present, and when the tubes were found to be tuberculous there would have been considerable risk in leaving them alone. He therefore approved of Dr. Solomons's treatment.

Dr. J. S. QUIN asked if erosion of the cervix was present or if there was any leucorrhœa.

Dr. G. W. THEOBALD referred to a patient who had been admitted to hospital said to be suffering from eclampsia. A lumbar puncture was done, but the patient died five minutes afterwards. At autopsy every gland was found to be a mass of tuberculosis. In the case described by Dr. Solomons, assuming that the patient had tuberculosis, encephalitis lethargica, and diphtheria, was it right to assume that the tuberculosis of the tubes was sufficient to cause the very definite symptoms from which she had suffered for a long period of time? Was it not likely that there was some focus of tuberculous infection elsewhere in the body?

Dr. SOLOMONS, in reply to Dr. Cassidy, said that the diagnosis was arrived at (1) by excluding other diseases, (2) by bimanual examination, and (3) by the appearance of the tubes taken in conjunction with the history of the case. He disagreed entirely with Dr. Cassidy about the treatment. He had a very large experience of tuberculosis of the tubes; he had tried palliative salpingostomy in cases of sterility in these cases, and had found that the results were bad. Either there was no cure of the sterility or there was recurrence of the disease. He therefore recommended strongly complete salpingectomy for tuberculosis of the tubes; in this way the disease was removed. The chance of pregnancy before removal was nil. There was no need to extirpate the uterus, for if it was infected the infection cleared up after salpingectomy. Treatment by radium and X rays was useful in general abdominal tuberculosis. In this case there was no erosion of the cervix, nor was there leucorrhœa. So far as could be felt there was no tuberculous disease higher up in the abdomen. He was convinced that this was a case of tuberculosis of the tubes causing pyrexia and cured by operation.

Dr. THEOBALD read a paper on the Contraction Ring in Labour.

JAMES MACKENZIE INSTITUTE FOR CLINICAL RESEARCH, ST. ANDREWS.

ON March 23rd Dr. J. H. P. PATON delivered a lecture on

Youthful Irregularity of the Pulse.

Mackenzie, he said, had pointed out that an irregular pulse was a physiological phenomenon of youth, which was exaggerated in convalescence from febrile illness. It tended to disappear in some febrile complaints, and its return was evidence that the toxic process causing its disappearance had become quiescent. The pulse was regular in only four out of 500 consecutive girls whom Dr. Paton had examined on admission to school. Each of the four in whom it was absent had proved to be suffering from a febrile complaint. From these facts, and from a large number of observations spread over some years, he concluded that the irregularity was never absent, except in disease, in girls from 8 to 16 years of age. Its absence was a valuable sign of ill-health, and its return in a marked form in convalescence had the same significance as the fall of temperature, and indicated that active toxæmia had ceased. This fact was evidently not generally known, since it was common for young persons to have their activities restricted because the pulse was irregular. The terms arrhythmia and irregularity carried a significance of abnormality which was doubtless the reason why Mackenzie's view had not received wider recognition. It was absence of irregularity that was the symptom of disease.

On March 30th Dr. Paton gave a second lecture in which he discussed the mechanism responsible for the irregularity of the youthful heart-beat. However simple an explanation of the phenomena might seem to some people, it was obvious from the views expressed by Mackenzie in the fourth edition of his "Diseases of the Heart" that none of them satisfied him completely. Mackenzie believed that both sympathetic and vagus impulses played a part in producing the arrhythmia, and concluded that the source of the impulses was probably to be found in the activity of the respiratory muscles or in some other peripheral source. He believed that the disappearance of the irregularity in febrile conditions was due to the action of toxins of microbic origin on the sino-auricular node, resulting in such an increase of rate that the irregularity was abolished. Referring to impulses from within the heart itself and to the variations in carbonic-acid content of the blood during respiration as possible causes of sinus arrhythmia, Dr. Paton said that the clinical evidence which he had been able to collect indicated that the irregularity had its origin in the activity of extracardiac reflex arcs of which the cardiac fibres of the vagus and sympathetic caused the effector response. The problem then could be stated simply: Where in health did the impulses determining the activity of these nerves originate and at what points were the reflex arcs interfered with in disease? Admittedly, no certain conclusions could be reached, but there was evidence which suggested that the impulses hastening the rate in inspiration were probably circulatory in origin, and had their source in the variation of the pulmonary capillaries in response to variation in intrathoracic pressure. The vagal stimuli inducing slowing in expiration probably originated in the variations of pressure or circulation in the abdomen. No pulmonary condition was known which induced slowing of the heart. He looked on the variation in rate as an attempt at adjustment to the changes in distribution of blood as between the pulmonary and systemic circulations, resulting from alterations in the capacity of the chest. The difficulty of the subject was due to the opposing action of the two cardiac nerves; it was impossible to differentiate the effect due to each.

A post-graduate course of 50 lectures and demonstrations for general practitioners is to be held at the Institute, St. Andrews, from June 14th to 30th. The subjects to be dealt with cover a large field, and those who wish to carry out practical work in the laboratories will be given facilities. The fee for the course is five guineas.

Corrigendum.—Dr. G. Roche Lynch informs us that he did not make the remarks attributed to him in our report of the discussion on Lead in Malignant Disease at the Medical Society of London (THE LANCET, March 27th, p. 659).

Reviews and Notices of Books.

THE PRODUCTION OF LOCAL IMMUNITY.

Immunisation Locale Pansements Spécifiques. By A. BESREDKA. Paris: Masson and Cie. 1925. Pp. 252. Fr.20.

THE title of this book is a little ambitious. Its scope is really limited to the phenomena exhibited when certain strains of infective bacteria are applied to the skin by the author's special method of "pansements spécifiques," and when certain of the intestinal groups of bacteria are administered by mouth. The author has here brought together the materials of experimental work, brief records of which have appeared from time to time since the war in the *Annales de l'Institut Pasteur*. The work has been further elaborated with historical reviews of the subject and a discussion of the mechanism of this particular type of immunity and theories—which latter the author points out are still very much in the evolutionary stage. Briefly stated, Prof. Besredka's method consists in infecting the shaved skin of the animal by the application of a dressing soaked in an attenuated or killed culture of the organism. This application is followed by local reaction of the surrounding skin, which lasts from four to six days and then subsides. The cuti-vaccination thus effected affords protection for the animal against a subsequent infecting dose of the same organism large enough to kill a control animal. Similar effects may be produced by intradermal injection. In both cases the animal acquires immunity, but the serum does not possess the power of protecting a normal animal against infection. This work has been carried out chiefly with *B. anthracis*, staphylococci, and streptococci. Similar experiments have been made by the intestinal route in the case of the dysentery group of organisms, the intestinal mucosa in this case appearing to act in the same way as does the intact skin in the case of anthrax bacilli, streptococci, and staphylococci. Finally, in the typhoid group, Prof. Besredka has been able to produce similar results by means of sensitising the intestinal mucosa by a preliminary treatment with ox bile. The book contains numerous data with regard to prophylactic inoculation against anthrax carried out on larger animals under agricultural conditions and against dysentery and typhoid fever on soldiers and refugees. The work contains many suggestive ideas and comes at an opportune time when the intradermal route for tuberculin testing and for other skin tests is becoming more and more used in applied clinical immunity. A good bibliography would have added considerably to its value.

BIRTH CONTROL AND THE STATE.

A Plea and a Forecast. By C. P. BLACKER, *M.C.*, M.R.C.S., L.R.C.P. London: Kegan, Paul, Trench, Trübner and Co., Ltd.; New York: E. P. Dutton and Co. 1926. Pp. 95. 2*s.* 6*d.*

THIS is a temperate and scholarly survey of the arguments for and against the encouragement of the practice of birth control. Dr. Blacker gives the impression that the controversy has aroused in him keen interest but no morbid excitement; he thus restores to a wholesome commonplace level a subject which some have exalted to an ecstatic plane, while others have trampled on it with dirty feet. Military, economic, religious, and socio-political arguments against contraception are here stated in trenchant terms; the arguments in favour of its wider practice are, if anything, less forcibly set out, so little has the author's own bias been allowed to prejudice the reader. For example, the prevalence of attempted abortion in the class where birth control is least practised is certainly not over-emphasised, and the estimate, founded on inquiries, that more than half the infants born in a hospital district are unwanted is not, we think, too high. The conclusion drawn from consideration of the complex problems involved is that if the existing form of civilisation is to have any permanence, the necessity for controlling population will have to be realised and striven for by the educated.

The main purpose of the book is to ask for an expression of an opinion by the medical profession as a whole, or in large majority, designed to induce the Minister of Health to permit medical officers of welfare centres to give instruction in birth control at their discretion. The admission, disconcertingly sandwiched in the middle of the book, that no really satisfactory contraceptive as yet exists, renders this plea less effective. Coitus interruptus is justly condemned as harmful to both sexes; the penile sheath is not likely to be used by the type of individual whose procreation it is desirable to restrict. There remain chemical suppositories or some form of rubber cap for use by the woman. Until a method is found which involves less manipulation of the female genital organs, less risk of occluding discharges from the cervix, and gives greater security than any of the chemical preparations now in use, it will be difficult to convince medical men that the time is ripe for official propaganda. It is fair to state that, provided information may be disseminated from welfare centres to suitable cases, Dr. Blacker is in favour of a veto on certain unofficial methods of propaganda, such as newspaper advertisements.

It is regrettable that in an essay built on such broad historical and biological foundations a critical inquiry as to the origin of the most recent world war should have been included. Concrete examples are admittedly more persuasive than abstract ones, but the subject of contraception is already so controversial that it is best supported where possible by examples from the history of times other than our own.

SURGERY.

Die Chirurgie. Edited by Prof. Dr. M. KIRSCHNER and Prof. Dr. O. NORDMANN. Berlin: Urban and Schwarzenberg. 1925. Vol. V., pp. 521, M.27; Vol. VI., pp. 358, M.21.

Two further sections in the new system of surgery edited by Kirschner and Nordmann have reached us. Vol. V. deals with the surgery of the kidney, ureter, urethra, penis, testicle, and cord. In itself it forms a text-book of genito-urinary surgery, except for the omission of diseases of the prostate and bladder. Its outlook is continental, and for that reason is of value to English surgeons. The information given appears to be reliable and to follow the usual urological practice. Where there are debatable points the writer gives the facts without inclining to one or other view. For instance, on the question of radical extirpation of the lumbar glands in the treatment of malignant tumours of the testicle, Dr. E. Wehner, the author of this section, asserts that sufficient knowledge has not yet been accumulated to give a judgment as to the advisability of this course being taken. He is also conservative in his attitude towards excision of, or operations upon, the seminal vesicles in tuberculous disease of the urinary tract. The surgery of the kidney and ureter is written by Prof. P. Frangenheim with the assistance of Dr. Wehner, and is a very satisfactory section.

Vol. VI. contains descriptions of the surgery of the mouth, pharynx, and salivary glands by Prof. F. Brüning, and the surgery of the larynx and trachea by Prof. J. Soerensen. The section on the mouth and tongue runs on familiar lines and makes a good treatise on stomatology. In the account of the treatment of cancer of the tongue it is stated that the glands are removed first and the primary growth second. No consideration is given to the reversal of this process. A warning is issued against a too wide application of tonsillectomy, on the grounds that the tonsil has a function, and that to destroy this is undesirable unless there is sufficient cause for doing so.

The chapters dealing with the surgery of the larynx are among the best we have seen in this system of surgery. The account is complete and Prof. Soerensen speaks with the authority of a very large experience. He and Gluck together have performed 788 total extirpations of the larynx. The very high primary mortality has been reduced enormously, so that in one year only 2 out of 100 patients died as the result of the operation. In 120 patients it was necessary to remove the upper part of the œsophagus as well as the larynx, a procedure which increases the mortality to a very great extent, so that of these patients 24 died. The end-results when this large operation is performed are also bad, as only nine were permanently cured. This is the operation the authors recommend for disease of the sinus pyriformis. They regard removal of the growth by lateral pharyngotomy as advocated by W. Trotter in this country as quite inadequate. Laryngectomy has also been performed by them for tuberculous disease of the larynx, but the results do not seem to us to justify its general adoption as a method of treatment.

Both these volumes are illustrated by a large number of coloured as well as black-and-white prints. The high standard set by the former parts of this work has been well maintained.

EVOLUTION.

A Naturalist in East Africa. By G. D. HALE CARPENTER. Oxford: Clarendon Press. 1926. With 25 illustrations, 8 plates of insects, and 3 maps. Pp. 182. 15*s.*

Evolution. By J. GRAHAM KERR. London: Macmillan and Co. 1926. With 2 coloured plates and 52 text figures. Pp. 278. 12*s.*

A BUTTERFLY-NET and a copy of Poulton's "Colours of Animals"—though we suspect that he carried this in his heart without burdening his pockets—gave Dr. Carpenter many happy hours while he was wandering about in Uganda and East Africa during the war, generally with no great burden of professional work. And his jolly book hands on a whiff of his gaiety to his readers; anyone with a feeling for natural history in the field will enjoy it and sympathise with the author's zest and excitement in a country which seems to be brimming over with life. And scattered all through are a diversity of observations of interest and many of importance. Dr. Carpenter interprets what he sees in terms of natural selection, and it is certainly impressive to read how he has sat down by a puddle and watched wagtails deliberately pick out one or two kinds from the varied assortment of butterflies which had gathered there to drink. The last chapter gives a full and well-illustrated account of a long series of experiments which he made on the likes and dislikes of a couple of tame monkeys for different insects. Altogether he has provided an excellent sequel to his "Naturalist on Lake Victoria."

Prof. Kerr tells the same tale in a different way. He has written a plain statement of what he believes about evolution and why he believes it. He learned his lessons, he says, in the open and in the tropics, and he has complemented this experience—which Darwin, Huxley, Bates, Wallace, Carpenter, and many others have found to be the unique experience of their lives—by a long and fruitful academic discipline in the laboratory. *Nullius in verba magistri* is a good motto, but the considered opinion of some people is bound to be received with more attention than that of some others; and we believe that this record of the matured results of such a wealth of observation and reflection will find a welcome in a world which has shown signs of being rather restless, and perhaps a little frivolous, about the "Origin of Species." The first five chapters deal with the facts of history, structure, and distribution which lead to the conclusion that evolution has really happened; the next four with heredity and its experimental study; the next with natural selection as the direct cause of evolutionary change; and the remaining five with adaptation, sexual selection, the evolution of communities, and man. In the main, Prof. Kerr adheres to the classical position: evolution is a fact; variability is inherent in all live things; the potency of natural selection is enormous, and the importance which Darwin attached to it has only been increased by the more recent knowledge of Mendelian inheritance, adaptation, and the coördination of the different parts of the body.

COMPARATIVE PHYSIOLOGY.

By L. T. HOGBEN. London: Sidgwick and Jackson. 1926. With 44 text figures. Pp. 219. 7*s.* 6*d.*

APART from his own researches, Dr. Hogben has already made a useful contribution to the admirable movement for a wider physiological outlook which is represented by the Society for Experimental Biology and its journal by his Introduction to Comparative Physiology written in conjunction with Dr. F. R. Winton. The present book is the first of a series of text-books of animal biology edited by Prof. Julian Huxley, which will be popular if the succeeding volumes maintain the high standard and low price. It surveys in order the general physiology of muscular movement, ciliary action, respiration, nutrition, circulation, endocrines, nervous system, fertilisation, inheritance, and development. It is necessarily brief, but the author has a happy knack of compressing a great deal of information into a very readable narrative. Most physiologists and most zoologists—for it is meant for both parties—will learn something from it, and will probably feel that its chief defect is that there is not more of it. With special comparative physiology it does not pretend to deal; indeed, it will be a long time yet before each animal or group of animals will have a physiology of its own. Dr. Hogben's book will encourage the curious to set about the task of creating one. The page-headings want reconsideration; their utility and importance are often underestimated by book makers.

PRACTICAL CLINICAL PSYCHIATRY.

For Students and Practitioners. By EDWARD A. STRECKER, A.M., M.D., Professor of Nervous and Mental Diseases, Jefferson Medical College, Philadelphia; and FRANKLIN G. EBAUGH, A.B., M.D., Professor of Psychiatry, University of Colorado. Philadelphia: P. Blakiston's Son and Co. 1925. Pp. 375.

PSYCHIATRY stands out as a most elusive and difficult branch of medical science, possessing little undisputed pathology or ætiology; very little is known of the causation of the majority of mental disorders, and their clinical pictures differ so widely that it is almost true that every patient has his own type of psychosis. Small wonder that of the many text-books on the subject, often admirable in other ways, hardly any is of much use to the student save as an academic introduction to the subject. These American authors have realised that a little practical experience is worth more than much study, and have taken the bold line of refusing to attempt any but the briefest theoretical annotation and general description. In default of actually conducting the student round the wards they come as near to it as possible, and instead of discussing the possible variations of every known form of disorder they select a number of the commonest complaints and describe an actual case of each one, chosen to present a clinical picture which shall be typical of the majority of cases of the same type, with full history and the detailed results of examination. It is obvious that they have only covered a small part of what its exponents understand by psychiatr but they have made that part both interesting and concrete. The book is not to be recommended as

the sole text-book for candidates for examination, but the student will probably learn far more from these specimen cases than he would from any of the larger standard works. He will, moreover, gain a grasp of the outstanding features of the commoner types of mental disease that will enable him to connect his theoretical knowledge with the cases he meets in the wards or out-patients' department. For the rest, the classification is not admirable, as it seems to have little system underlying it and to be impossible to memorise; the English is turgid and the diagrams are obscure. The scheme of examination, however, placed early in the book, is thorough and practical; the bibliography is very complete, and there are several good photographs. The volume deserves to become popular not only with students but with general practitioners, social workers, and others whose occupation demands a practical rather than an exhaustive theoretical knowledge of this difficult subject.

POPULATION.

By A. M. CARR-SAUNDERS. In the "World's Manuals" Series. London: Oxford University Press. 1925. Pp. 112. 2*s.* 6*d.*

The Natural Increase of Mankind. By J. SHIRLEY SWEENEY, D.Sc. With an introduction by WILLIAM H. WELCH, M.D. Baltimore: The Williams and Wilkins Company; London: Baillière, Tindall and Cox. 1926. Pp. 185. $4.00.

The Biology of Population Growth. By RAYMOND PEARL, Director of the Institute of Biological Research, Johns Hopkins University. New York: Alfred A. Knopf. 1925. Pp. 260. $3.50.

ONE of the most insistent of post-war problems is that of population. Is Great Britain over-populated? Can birth control cure unemployment? Is population-pressure an important cause of war? These are some of the questions arising directly from the excogitation of recent and present political affairs. Expert witnesses are found in opposition, and feeling tends to run high when reformers disagree on matters of fundamental importance to the welfare of mankind. It is of all the more happy augury that men who have a scientific rather than humanitarian interest should be publishing at present the results of their careful research into the causes of population, growth, and the natural laws which govern the increase of the human race.

The popular handbook by Mr. Carr-Saunders, while no substitute for the valuable study which he published four years ago,[1] is an admirable introduction to the subject, and contains much useful statistical information. The diagram comparing the rates of growth of various European countries and of the United States is clear and interesting, although a fairer comparison of such rates would be obtained by plotting the millions of inhabitants upon logarithmic rather than on arithmetic scale.

Dr. Sweeney describes his book, prepared as a thesis for the D.Sc. in Public Health of Johns Hopkins University, as an Analysis of Population as a World Problem. It is "the most comprehensive world-wide study of this subject made in recent years by the application of a uniform statistical method." Dr. Welch says so, and his authority is not to be gainsaid. Indeed, the apparent care with which the author marshals authority, pro and con, on every issue that he raises, almost serves at times to obliterate his own personality. Yet he has his philosophy, and it emerges eventually in a scheme for an international agreement to control numbers by a league of stationary populations. He believes, as Mr. Carr-Saunders does, that our populations are growing too large, though his dislike of dense population is based on somewhat different considerations. Mr. Carr-Saunders sees a menace to the quality of life from over-urbanisation. His viewpoint here, as in other questions, is original and stimulating. Dr. Sweeney's chief anxiety seems to be the inevitability of international conflict if "relative over-population" is allowed to proceed—as, in the author's opinion, it almost certainly will. His suggestion is to make birth control not merely permissible, but even compulsory according to a scale fixed by concord between the competing powers.

The solution seems plausible enough in the context, but faith in its efficacy is rudely shaken by a perusal of Dr. Pearl's latest contribution to the biology of population growth. Herein, the inevitable laws formerly expounded in "Studies in Human Biology" are by further researches made to appear still more inexorable. A particularly striking example is the growth of the native population of Algeria. In that country no widely spread public health control can have affected death-rates, no artificial interference with conception can have slackened the birth-rate, yet the population climbs just as surely the mathematical slope of the logistic curve as in more civilised countries where water is never drunk without its due supply of chlorine, and where contraception, whether legal or illegal, has its innumerable devotees. Since Dr. Pearl read his paper to the Baltimore Conference on Birth Control in 1923[2] he has changed his mind somewhat on the menace of population growth. He no longer believes that a refusal to control the rate of reproduction will have the effect that "our children's grandchildren and great-grandchildren will probably see such an amount of suffering, a standard of living so lowered, as to make these parlous times seem paradise indeed." On the contrary, he takes comfort now from the thought that France "is a country with a population near the maximum for the present cycle. But he who thinks France an unhappy or wretched country is both ignorant and stupid." But France reaches her asymptote with a population less dense than that of England and Wales, though our country is still on the climb! Our slope is a steeper slope, and Dr. Pearl is keen to point out the great rewards coming to that biometrician who will determine for us the natural laws which dictate what slope the logistic curve of growth shall take for any particular people.

GILLES DE RAIS: THE ORIGINAL BLUEBEARD.

By A. L. VINCENT and CLARE BINNS. Introduction by M. HAMBLIN SMITH, M.A., M.D., Medical Officer H.M. Prison, Birmingham. London: A. M. Philpot, Ltd. 1926. Pp. 221. 8*s.* 6*d.*

Gilles de Rais is one of the most outstanding examples in history of the sexual pervert, and although everyone has heard of him under the name of Gilles de Retz as the origin of the Bluebeard legend, he had but one wife, and his crimes were perpetrated, chiefly at any rate, against young men and lads. It appears that this is the first account in English of his horrible life, and the story is full though quite discreetly told. It shows the descent of a highly-born and enormously wealthy youth through profligacy to necromancy, and through foulness of all sorts to multiple murder. The degraded man at several stages in his career gave proofs of capacity for better things. More than once he proved himself a brave and capable soldier, was a valuable comrade in arms of Joan of Arc, and became a Marshal of France. He was also a great stage manager and the author of the libretto in some of the numerous pageants which he instituted. When at last his enormities brought their reward he met execution with fortitude, not attempting any apology for his crimes, and apparently believing that repentance in this world would stand him in the necessary stead elsewhere. A copious bibliography shows how many authors of medical and scientific repute have employed the Lord of Champtocé as an illustration of perversion.

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[1] Reviewed in THE LANCET, 1922, ii., 181.

[2] See Chapter III., Birth Control: Facts and Responsibilities. Edited by Adolf Meyer, M.D. Williams and Wilkins. 1925. $3.00.

THE LANCET.

LONDON: SATURDAY, APRIL 10, 1926.

THE HEALTH OF THE COAL-MINER.

IT is no direct part of the duty of this paper to comment on the situation, so serious for us all, that has been brought about by the general conditions of coal-mining, the withdrawal of the subsidy under which some two-thirds of the coal is produced without a loss, and the issue of the Report of the Coal Commission with its far-reaching recommendations and its detailed suggestions for adjustments. The decisions of the conference of miners, to be held at the end of the week, if a forecast may be held to have been made by the leaders, may result in opposing the method of a revision of wages by negotiation, leaving the responsibility here to the employers. A resolution to this effect would not be tantamount to a rejection of the Report of the Commission, but it should bring home to the community, unfortunately only within three weeks of the cessation of the subsidy, how anxious is the impending crisis.

With these large general questions we are all acutely concerned, but, in considering the Report of the Royal Commission, the following comments are confined to the recommendations more especially and immediately concerning the safety and health of the miners. Whatever the general issue of discussion that must now be pursued until great decisions are arrived at, the Report of the Royal Commission is bound to exert a far-reaching influence on the sanitary conditions under which the work is done. Whatever be the final results of negotiations on such matters as minimum and subsistence wage agreements, the broad and understanding survey provided by the Report of our most important industry, and our largest industry after agriculture will bear good fruit. Conditions much hinted at, much surmised, and now and again demonstrated by those who know, have become comprehensible to the public. Although, as was inevitable, the technical and economic aspects of the industry have received the greatest share of consideration, the human factor is kept steadily before us in valuable sections of the document. Thus, while State ownership of minerals, amalgamation of neighbouring mines, combination with allied industries, fuel research, reorganisation of distribution, guarantee of quality, and pooling of railway wagons are all recommended, the Commissioners also advocate: the formation of pit committees by whom other things than wages may be negotiated; the introduction of a family allowance system; obligatory profit-sharing by the workmen; proper provision of houses as a condition of lease for all new collieries; the establishment of pithead baths; and annual holidays with pay. Every one of these recommendations, which but a few years ago would have been deemed revolutionary, and which certainly involve principles which are applicable to other industries, must command the support of medical men. The family allowance, for long advocated by Miss ELEANOR RATHBONE, would improve the wage system in exactly the way most promising to the health of the employees, but improved housing should come concurrently.

The Commissioners recognise in frank terms that the industry presents for investigation and observation facts and factors so far hardly realised. More than 1,000,000 men and lads are employed under working conditions which, while broadly alike, differ in minor details on the separate coalfields. The mortality experienced by coal-miners is fairly low; yet the Lancashire miner, with the South Wales miner not far behind, has a mortality nearly double that of his fellow in the Nottingham area. Now the Lancashire and South Wales miners have always manifested the greatest unrest as a class; unrest in the industry appears therefore quite clearly as a psychological expression of ill-being. The time at the disposal of the Commissioners was too short for them to await the result of investigations into such matters—to be conclusive, a research of years rather than of months would have been necessary—but the relation of unrest to mortality must be borne in mind as a practical as well as a humanitarian argument for reforms. Apart from accidents and industrial diseases there is no evidence to show that mining is not a healthy occupation. But the mining industry holds an unenviable priority with regard to the incidents and accidents for which compensation is made, as well as for occupational diseases, and the work already undertaken by the Medical Research Council should be recalled in connexion with the Report. An expert committee of the Council has already issued reports on many diseases incidental to miners, and is continuing its researches into miners' nystagmus, which accounts for more cases, and a larger sum paid out every year, than all other compensation diseases taken together. The conclusions here do not clash with those arrived at by Mr. POOLEY in an article which we publish this week, and all observers seem agreed to consider the pathology of the disease still not clear, and its occurrence not of the sinister importance that might seem postulated by the money paid in compensation. Beat-knee, -hand, and -elbow, which stand respectively second, third and equal fourth with lead poisoning in the list of occupational diseases, have also been considered by the Medical Research Council's committee, and an inquiry into the relation of lost time to sickness at different collieries is under weigh. Another research is disclosing the existence, previously only dimly suspected, of silicosis among a small group of underground men who use pneumatic drills on hard rock; while the physiological conditions of underground ventilation are also being closely studied. Meanwhile the Safety in Mines Research Board, financed from the Welfare Fund, is covering a wide and comprehensive field of research aimed at preventing explosions and rendering mining work less dangerous. The activities inaugurated by the Fund are praised by the Commissioners; already their influence can be traced in better relations existing between employers and employed.

We are sure that the connexion between mortality and unrest has always been of profound importance to the industry. The successful dealing with the manifestations of industrial disease, and the establishment of pithead baths throughout the coalfields, will go far to improve the physical and mental well-being of the miners, of whom to-day only some 8000 out of the 1,000,000, going below ground daily, have the chance of a bath at the pithead, but from the sanitary point of view the housing question is the outstanding one. To set the foundations of the industry firm economically will tax the ingenuity

of all concerned as well as their willingness to make sacrifices, but no economical reform which fails to take the health of the miner into consideration has the slightest chance of life, and but little chance of being born alive. How far the various pathological conditions are due to or are promoted by bad housing, and what relation there may be between bad environment and the occurrence of accidents, can only be subjects of rough estimate. The numerous points could not well be summarised to make a reference for a body of expert inquirers, but apart from the quite possibly mischievous influence of bad housing upon the mining industry, in particular all medical men will feel that the housing conditions of the miners must be remedied. These conditions are often very bad. The Report sets out what is indeed common knowledge. Many of the old mining villages consist of poorly constructed cottages, small and frequently overcrowded, with sanitary arrangements that are primitive and inadequate. This, though shocking, is readily to be understood when we remember that the mining village was often built to serve a temporary purpose; and it is right to say here that some of the new colliery companies have planned for the miners well-constructed and well-equipped garden villages, while in districts where the housing is usually poor there may be found groups of excellent new cottages built by enterprising proprietors or local authorities. In certain collieries the influence of the free colliery house is baleful; the great majority of these houses are atrocious, and they have set a low standard for the whole of the housing in Northumberland and Durham. There is thus every gradation between good and bad housing, but the merits of the good do not cancel the evils of the bad. The necessity for a levelling-up of the housing conditions of miners is paramount, and we trust that it will be kept steadily in the minds of those who have now to deal with the anxious and complicated situation.

THE RISKS OF HYPOTHESIS.

IN his Goulstonian Lectures, which are appearing in our columns, Dr. BERNARD HART opens up a wide subject when he lays down principles by which the claims of scientific hypotheses, especially concerning psychopathology, can be tested and appraised. Mankind has an innate desire to know, and in satisfaction of this desire the most primitive races produce speculations belonging to the conceptual as opposed to the perceptual level. There is every gradation between the simple speculation of the savage and the complex hypothesis of the man of science; each is arrived at by the pressure of the same psychological motive, each would appeal to the tribunal of experience, and in the case of each there is felt a sense of power when a new generalisation is made. Danger lies in this sense of power, for its gratification may lead to a specious appearance of knowledge when knowledge has not yet been attained; the man who believed thunder to be the voice of an offended deity probably felt immensely superior to the ignoramus who lacked that explanation.

Dr. HART, perhaps, had in mind such a danger when he warned us that the desired consummation of reducing the concepts of psychology to the wider concepts of physiology is brought no nearer by pretending that it has been attained. He gives the three successive steps, as enunciated by KARL PEARSON, which distinguish the scientific method, and makes the claim that it is the method, not the material handled, which characterises science. These steps are the collection of facts, their classification, and finally the construction of conceptions which serve to explain them. Scientific canons, ensuring that each step is kept in close contact with observation, are needed to check the primitive tendency to believe that any hypothesis is better than a confession of ignorance, for at each step there may be only a semblance of scientific method; the facts may be wrongly observed, their collection may be inadequate, and the generalisations may be premature. Perhaps the commonest error has been to leap to a final conception before the observation and collection of facts are sufficient, and this error plainly arises from the strong desire to believe that we know. When we act upon such a premature hypothesis, our results are probably futile and the greatest evil may lie in the arrest of inquiry. A notable result of the hurried leap to a conclusion is found in the case of hysteria. Attributed, on observations not entirely baseless, to the wanderings of the unsatisfied uterus, hysteria came to be treated with evil-tasting drugs intended to drive that organ back to its proper place, and, although this therapeutic aim has been lost, the use of the drugs has survived. A fuller collection of the facts upon which the theory was thus inadequately based might have led our professional forbears to anticipate some of the findings of modern psychopathology, but it is likely that even in the days of GALEN there was a tendency to seek in physiological terms for a satisfying explanation of psychological phenomena. Such survivals as lunacy, melancholia, and hypochondria indicate the range of this tendency, and the use of concepts like nerve exhaustion and brain fag still satisfies the desire to believe we know the unknown.

Yet, as Dr. HART points out, we are not prevented from using a working hypothesis which is independent of phenomenal reality. Although its existence is not a fact of experience yet the scientific conception of the ether is most fruitful; and the theory of the indivisible atom produced discoveries which led to its own downfall, thus demonstrating, by a curious paradox, at the same time both its value and its invalidity. Psychology, like other sciences, has produced numerous hypotheses. Faculty psychology has proved barren; intellectualist psychology has proved erroneous; instinct psychology provides little more than a collection of algebraic expressions useful for resuming facts under convenient headings; suggestionist psychology, as Dr. HART shows, has proved disastrously soothing. It seems that the hypothesis of the unconscious has now become fruitful after a long period of relative futility. Framed to account for curious phenomena which fell outside the bounds of ordinary rational experience, it received no further definition for many years until FREUD found it indispensable to explain a large number of newly observed facts. It is certainly free from the appeal to a desire for easy explanations, and, though this places it at a disadvantage when confronted by more facile hypotheses expressed in terms of the concrete, yet this freedom should encourage us not to evade its difficulties in favour of more alluring, because more facile, speculations.

THE CARDIAC CLINIC.

WE referred recently to the work of the American Association for the Prevention and Relief of Heart Disease and to their official publication, the *American Heart Journal*. In the *New York State Journal of Medicine* for Nov. 1st, 1925, Dr. JOHN WYCKOFF discusses the scope and organisation of clinics for the treatment of cardiac cases. He points out that any

special clinic must necessarily overlap fields of medicine other than that to which it is particularly devoted, and consequently it is essential for the cardiac clinic to be in close touch with other departments, such as the venereal clinic, the oto-laryngological clinic, and the dental clinic. In addition, there should be available the laboratory facilities of a large general hospital, both for pathological investigations and for special studies, such as X ray and electrocardiographic examinations. Dr. WYCKOFF emphasises the importance of close association of the clinic with an in-patient department, not only in the interests of the patients, but also on account of its instructive value in enabling the young physician to study the different aspects of heart disease. As he aptly puts it, "in the ward one sees but a small cross-section of the cardiac's life, whereas in the ambulatory clinic one learns the course of chronic heart disease, its management and treatment." Very few, if any, physicians can hope to keep in close touch with the recent advances in all fields of medicine, and if patients are to get the benefit of these advances, specialisation is a necessity. On the other hand, the specialist must work in the closest coöperation with those of his colleagues whose interests lie in other fields.

The functions of the cardiac clinic are to keep the ambulatory patient with organic heart disease in the best possible health for as long a time as possible; this involves first a full and accurate diagnosis and, secondly, treatment. The diagnosis comprises not merely the structural and functional considerations, but also a careful survey of the social conditions, environment, and habits, as well as the financial status and responsibilities of the patient. Unless these latter points receive due consideration, the actual medical treatment cannot yield the best results. For this purpose the staff of the clinic have to rely principally on the social service branch, whose members visit the patients in their homes and are in a position to furnish the necessary information on these points to the medical officer. In order that the social service workers may not waste their time in attempting to cover too wide an area, any one clinic should confine its attentions to such patients as live within easy range of the hospital, and when a patient moves his residence he should be transferred to another clinic. The staff of the clinic includes a clerical section composed of lay workers, whose duty it is to relieve the medical staff of all non-technical matters, and to facilitate the following up of cases and statistical research by an efficient system of record-keeping and cross-indexing. As cases come up for re-examination it should be possible to obtain the latest data concerning their progress and the results of previous treatment, in order that these may be carefully reviewed before the future line of treatment is decided upon. A regular routine in the examination of patients is essential where large numbers of patients are being dealt with, and the method which has been adopted at the Belle Vue Hospital is as follows. At the first visit the patient's history is taken, he is examined, and temporary treatment is instituted. The social service worker then visits his home. The following week special examinations of the nose and throat, electrocardiogram and X ray are made, while on his third visit he is seen by the dentist, and the physician in charge has at his disposal the full information necessary to enable him to institute a permanent line of treatment.

Dr. WYCKOFF raises an important point with regard to the transference of patients from the children's to the adult clinic. It is at this stage that patients are most liable to be lost sight of, and he suggests that the best remedy is to form an intermediate adolescent clinic which will take them over at the age of 16 and subsequently transfer them to the adult clinic at the age of 18, when they are more likely to realise the importance of continuing their attendance. The writer points out the importance of differentiating between cases which are likely to benefit from a period in a convalescent home from those which cannot have any reasonable hope of building up their cardiac reserve by convalescent treatment. For although these latter may be able to live within their cardiac reserve for several months while at the convalescent home, sooner or later they are bound to become bed cases. They occupy accommodation at the convalescent home without the prospect of deriving any corresponding benefit therefrom, and provision should be made for them in the form of a hospital for permanently disabled.

The work which is being done by the cardiac clinics in America is of economic value. It enables those who are the subjects of heart disease, but still able to work, to obtain expert advice and treatment, and so diminishes the wastage from this cause during the most productive period of life.

THE JOINT TUBERCULOSIS COUNCIL.

IN the general development of tuberculosis work which followed the provision of sanatorium benefit and the appointment of tuberculosis officers a need was apparent for close coöperation between the many and varied bodies and individuals concerned. But such coöperation, with resulting coördination of effort, was not by any means easily attainable. Although consultants, tuberculosis officers, research workers, medical superintendents of sanatoriums, and others all had their own circles of interest and information, those circles and their societies had few opportunities for effective joint discussion of common problems or for common action. In order to meet this state of affairs the Joint Tuberculosis Council was set up, and has gone far to remedy the defects of organisation. The Council comprises representatives of practically all societies, associations, and Government departments actively concerned in tuberculosis work. It meets quarterly, or more often as may be required, and the considerable amount of work it has done since its inception in March, 1924, shows that the meetings are not merely formal. A special committee has taken in hand projects for collective research, keeping in touch with the Medical Research Council. Post-graduate courses have been held (some of which are announced on page 790), and are being further developed. Evidence has been given before the Royal Commission on National Health Insurance; and such subjects as the employment of tuberculous persons have been considered in practical detail. The whole object of, and justification for, the Council is the attainment of coöperation and coördination amongst all tuberculosis workers. With such an object and such practical evidence of useful work already performed the Council is to be welcomed as a valuable addition to the antituberculosis forces of the country. Sir HENRY GAUVAIN is the chairman, and Dr. E. WARD the hon. secretary.

AN election to the Council of the Royal College of Surgeons of England will be held on Thursday, July 1st, 1926. There are four vacancies, and the following 12 have signified their intention to be candidates: Mr. E. W. Hey Groves, Sir Herbert Waterhouse, Mr. Warren Low, Mr. W. E. Miles, Mr. H. J. Paterson, Mr. Victor Bonney, Mr. J. P. Lockhart-Mummery, Mr. Philip Turner, Mr. C. A. R. Nitch, Mr. Hugh Lett, Mr. G. Grey Turner, and Mr. C. C. Choyce. Prof. Hey Groves, retiring from the Council in rotation, is standing for re-election.

Annotations.

"Ne quid nimis."

PNEUMOCOCCAL PERITONITIS.

Pneumococcal peritonitis was selected as the subject for the Ingleby Lecture for 1924 by Mr. A. W. Nuthall,[1] and the disease was also discussed at a recent meeting of the London Association of Medical Women's Federation, reported in THE LANCET last week. It is an interesting affection from several points of view. It is arresting in its rapidity of evolution in the fulminating cases, and very often tragic in its inexorable progression towards death in those protracted cases where there seems at least reasonable grounds for anticipating a happy issue. Sometimes the disease appears to be a primary peritonitis, at others it is secondary to a pneumococcal infection elsewhere. The path by which the organism reaches the abdominal cavity in the idiopathic cases is a matter of controversy. J. Fraser and J. E. McCartney[2] brought powerful evidence forward to show that infection takes place from the vagina by way of the Fallopian tubes. They have never seen the primary form in boys in whom the condition seems always to be a sequela to a severe pneumococcal infection elsewhere in the body. They found that in early cases the most advanced changes were at the bottom of the pelvis. Mr. Nuthall does not agree with this view. In two of his patients careful bacteriological search failed to reveal pneumococci in the Fallopian tubes, and he has seen cases in boys where there was no clinical evidence of a visceral lesion to which the disease could be said to be secondary. He believes the peritonitis to be always due to a septicæmia and that the portal of entry is in all likelihood the pharynx. Clinically, pneumococcal peritonitis is characterised by a peculiar absence of the local pain, local tenderness, and local rigidity of other forms. The patient is much more ill than the local symptoms seem to indicate. The bad prognosis would seem to be related with the blood infection; the victim has to overcome a septicæmia of which the peritonitis is only a symptom. The diagnosis is admittedly difficult at first and, the disease being rare, it is unlikely to be prominent in the mind of the practitioner. Some clinicians have been able to demonstrate pneumococci in peritoneal exudate obtained by paracentesis with a fine hollow needle.

The outlook in the disease is so bad that it is not surprising that dissatisfaction with methods of treatment exists. McCartney and Fraser recommend blood transfusion as an accessory measure, and this seems to have proved a powerful weapon of offence. They also recommend early operation as giving the best prospect of cure. Nuthall, on the contrary, thinks operation in the early stage to be not only useless but positively harmful, and compares the condition with acute empyema where delay until frank pus forms has proved to be the better course. He recommends the surgeon to wait until the acute toxæmic stage is passed. Miss Gertrude Herzfeld, at the meeting referred to above, declared that drainage of the lower abdomen was the only possible treatment and that blood transfusion had not proved of much avail. There would, therefore, seem to be room for further investigation in this peculiarly fatal disease.

A SCIENTIFIC ANNIVERSARY.

This month 25 years ago, writes our Swiss correspondent, Dr. Oscar Bernhard, then medical officer of the Engadin District Hospital at Samaden, made his first experiments with sunlight treatment. He started on purely empirical lines. To him, as an old Engadiner, the method in use amongst the inhabitants of his country of preserving meat and specially bacon by hanging it in the dry air and in the sun was well known. The antiseptic and drying effect of the sun's rays as shown in this method led Dr. Bernhard to try its use on living tissue. The first patient to give him an occasion for this experiment was an Italian with a large open wound which was proving refractory to the usual treatment. On a beautiful day when the sun's rays filled the hospital ward, Dr. Bernhard ordered the wound of his Italian patient to be exposed to air and sunshine. The success of this treatment was a surprise to everyone. The granulations quickly became normal and epithelisation began to take place. Many other experiments followed, the method was scientifically enlarged, and to-day heliotherapy is an established practice. The splendid experiences with the new method in the Engadin were soon tried in other suitable places, especially by Dr. Rollier at Leysin.

INTRAPERITONEAL INFUSION OF INFANTS.

THE most essential therapeutic measure in the treatment of severe intoxications in infancy consists of the avoidance or removal of dehydration, to which infants are peculiarly susceptible and readily succumb. The administration of fluids by the mouth, except in very small quantities, is usually difficult in the presence of even a moderate degree of toxicity; in many conditions it is rendered uncertain by the vomiting which it provokes or by pre-existent diarrhœa. Intravenous infusion is contra-indicated by the difficulty of the procedure and the damage to veins which may ensue. Rectal enemata are not retained with any degree of certainty; if the rectal route is adopted it is necessary to employ the method of continuous enteroclysis, which has many advocates and is generally satisfactory when the need of fluids is not urgent or prolonged. The absorption of fluids by this method is somewhat slow, and if it is continued for a long period the tube may cause irritation of the mucosa. In cases of severe dehydration—particularly those occasioned by alimentary decomposition—the choice will usually lie between the two methods of subcutaneous and intraperitoneal injection.

The advantages of the subcutaneous route are obvious; it is simple and easy, no question of damage to organs can arise, and the result of any flaw in the aseptic precautions should not be unduly serious. As an emergency measure under unfavourable hygienic conditions it is clearly to be preferred. It has, however, been the experience of many physicians that the results which it yields fall far short of the ideal. It is difficult to introduce more than about 50 c.cm. of fluid without causing local discomfort to the infant, and there may be considerable leakage through the needle track. The rate of absorption is very variable, and in comatose infants may be too slow to be effective. There is little doubt that in all cases where a rapid absorption of a considerable amount of saline is desired, the intraperitoneal route will best meet the requirements. Like most ideal methods, intraperitoneal infusion makes greater demands on the technique, and perhaps the courage, of its employer. The two possible objections to it are the risk of infection and the risk of damaging an abdominal organ. The first is a very real one; the adoption of this method is only justifiable when strict aseptic conditions can be obtained. The second risk appears to have presented less difficulty than might have been expected, and can be obviated by suitable technique. There is undoubted danger of injury if a sharp straight needle is used. Weinburg devised a method for which excellent results have been claimed. He used a needle with a comparatively blunt point, inserting it at a spot corresponding to McBurney's point on the left side. He was able to introduce up to 200 c.cm. of fluid without causing any inconvenience to the infant, and in no case was there any injury of underlying organs. He established the fact that absorption was very much more rapid than in subcutaneous infusion. Aikmann drew attention to the risk of injuring the bladder, and inserted

[1] Birmingham Medical Review, March, 1926, p. 103.
[2] Brit. Jour. Surg., 1922, ix., 479.

the needle immediately below the umbilicus. A disadvantage of Weinburg's technique lies in the necessity of a preliminary incision of the skin, owing to the bluntness of the needle. This drawback appears to have been overcome by Dr. I. W. Gallant and Dr. R. M. Gordon, who have devised a sharp-pointed curved needle with the aperture in its convex surface. This needle, an account of which was given in THE LANCET of March 27th, p. 666, is passed through a fold of abdominal wall which is drawn up by the finger and thumb. This procedure should prove to be a distinct improvement, and is worthy of trial by all who use the peritoneal route.

The benefit obtained by the introduction of saline is established beyond all doubt, but on the question of the efficacy of nutrient infusions there is not the same degree of unanimity. It has been a common practice to add glucose to the saline, and there is experimental evidence that it is absorbed; it is therefore undoubtedly a rational therapeutic measure. The introduction of blood serum has been tried and does not appear to be followed by any undesirable reaction. The improvement brought about by saline infusion alone is so striking that it is difficult to obtain clinical evidence of the extent to which the addition of nutrient material may have participated in the result. Infants tolerate starvation so well, and dehydration so badly, that this question is particularly hard to decide from the results which they yield.

MASSIVE DOSAGE WITH DIGITALIS.

THE value of the method introduced [1] by Prof. Cary Eggleston, of New York, for the treatment of acute heart failure associated with auricular fibrillation by the oral administration of massive doses of digitalis has not yet been fully appreciated in this country. Why in such cases we should be content to wait several days before achieving the full therapeutic effect of the drug, when it can be obtained with safety in 24 hours, is difficult to understand, unless it be on account of the idea that digitalis is a dangerous drug. Most potent drugs are dangerous if improperly used, but the toxic manifestations of overdosage with digitalis are so well recognised, and the precautions necessary to avoid misadventure are so simple, as to leave no reasonable cause for anxiety. To continue to give digitalis after the heart rate has already reached a subnormal figure, or after bigeminal heart action has set in is to court disaster; but with these clear signs in addition to the gastro-intestinal danger signals as a guide, there is little cause for apprehension. Again, the rate of absorption and elimination of digitalis has been accurately determined, and by allowing an interval of six hours to elapse between doses, any possible danger from cumulative action can be excluded.

In the February number of the *Edinburgh Medical Journal* Dr. A. Rae Gilchrist summarises his experience in 50 cases of auricular fibrillation with heart failure treated by digitalis in massive doses. When the condition of the patient was not urgent, the administration of digitalis was preceded by a control period of rest in bed for several days. The drug was given in the form of the powdered leaf, the full quantity as calculated from Eggleston's formula being divided into three doses given at four-hourly intervals. Dr. Gilchrist states that in most cases there was marked slowing of the heart six hours after the first dose, and that the maximal effect was produced in less than 24 hours, except in those cases where there was much portal congestion, when it was frequently delayed for 48 hours. The slowing effect of the digitalis persisted in most cases for from two to ten days. Dr. Gilchrist points out that the toxic dose of digitalis is very close to the therapeutic dose, but in the rheumatic cases of his series there were no severe toxic manifestations, nor were there any disorders of rhythm apart from occasional extrasystoles. In four patients with normal rhythm, however, auricular fibrillation was induced by the administration of massive doses of digitalis; in two of these the normal rhythm returned spontaneously. Toxic manifestations were more prone to occur where fibrillation was associated with arterio-sclerotic type of myocardial disease. Bigeminal heart action was frequent in this group, and in one case digitalis provoked an attack of paroxysmal ventricular tachycardia. Dr. Gilchrist considers that in urgent cases of heart failure the oral administration of massive doses of digitalis is less dangerous than the intravenous administration of strophanthin. His conclusion that this method of treatment finds its most useful place in cases of auricular fibrillation occurring in the subjects of rheumatic heart disease is in accord with clinical observation elsewhere.

[1] Amer. Jour. Med. Sci., 1920, clx., 625.

SURFACE RADIUM-THERAPY.

IN ordinary superficial applications of radium the tissues at a depth receive some of the penetrating gamma rays from radium C which always accompany the beta rays coming away from applicators containing radium or radon in equilibrium with its active deposit of "quick change." In some instances, no doubt, the degree of the reaction of a superficial region thus treated depends upon this gamma-irradiated region, and in the case of human skin reactions it has been shown by Mottram and Russ that if two neighbouring regions of the skin are given equivalent surface intensities of beta and of gamma radiation, that due to the gamma radiation will be more profound in character—the inference being that, although the superficial intensities are the same the structures below the gamma ray surface are more heavily irradiated and contribute to the surface reaction. Perhaps in some skin conditions it would be a good thing if the deeper structures were entirely spared irradiation while a dose is being given to the surface. The method of using the radium active deposit of "slow change" described by Mr. J. P. McHutchison and Dr. W. H. Brown on page 755 of this issue will allow of this being done; for although two of the products used—namely, radium D and radium E—emit gamma rays, they have very little penetrating power; in fact, the combined beta and gamma rays from the preparations used are reduced to a very small percentage of the surface intensity by traversing 3 mm. of tissues. These radio-active preparations may be looked upon, therefore, as giving out radiation only equivalent in penetrating power to very soft X rays and of very weak intensity. Apparently the strongest applicators yet used by the authors gave an erythema of the skin only after seven to eight days' continuous application. It will be of interest to know, as clinical material accumulates, whether the skin reaction is of the same character as results from intense beams of X rays or of ordinary radium sources where the exposures are often a matter of minutes. Recognisable differences would be expected when the intensity is so much reduced, even though the physical dose is identical. Valuable information is given by the authors about their methods of retrieving the active deposit from used radon supplies. This has been a work of scientific economy and will doubtless be made use of at centres where radon in quantities is used.

SWEATING.

"MAN," said Richard Owen, "is naked and is the only terrestrial mammal in that predicament." He also has an unrivalled power of sweating, and the known and unknown meanings of this capacity are enough to make the study of those rare individuals who cannot sweat a matter of some interest. In the *Journal of Biological Chemistry* (vol. lxvii., 1926, p. 397) Dr. H. B. Richardson describes some calorimetric studies on a case of congenital absence of sweat glands. The boy's practical trouble was that he could not play in summer because he got too hot and had to stop, and he seems to have found out

for himself that if he wetted his shirt he could exercise with less discomfort. Detailed examination of his heat production and water elimination under various conditions led to interesting results. The water vapour given off at rest was normal and the evaporation of water accounted for the normal proportion of heat loss. More than two-thirds of the water came from the skin, and it seems clear that considerable quantities can be eliminated through the skin without the intervention of sweat glands, which are apparently not responsible for "insensible perspiration." Under exercise the quantity of heat lost by water vapour was definitely less than normal and the body temperature rose; in hot air also there was no increase of water loss and the temperature rose rapidly. From which it appears that sweat glands have developed to supplement the evacuation of water vapour through the skin; they are not absolutely necessary, and constitute an emergency apparatus which, like some other body mechanisms, becomes progressively less essential as conditions of life and survival become easier.

CHILD WELFARE IN THE UNITED STATES.

IN an address recently given in Birmingham at a meeting of the Maternity and Child Welfare group of the Society of Medical Officers of Health, and now appearing in *Public Health*, Dr. Ethel Cassie gave an account of a three months' visit to some of the great eastern cities of the United States. The visit was undertaken in order to study the work done on behalf of women and children, whether carried out by States, by municipalities, or by private bodies. The vital statistics for the United States are, on the whole, distinctly more favourable than are those for England and Wales, the birth-rate being higher (22·5 as compared with 20·4) and the general death-rate and infant mortality-rate lower (11·4 and 76 as compared with 12·8 and 77). Dr. Cassie believes the chief cause for this difference to lie in the absence of any serious degree of poverty in the United States, and in the much better standard of housing. The public health service appeared to her to be less well organised than our own, and much less inclusive, except in regard to propaganda. The Children's Bureau at Washington, while possessing its own staff for direct investigations, carries out most of its work through the directors of child hygiene in the various cities and States, the general organisation in each differing very little. In New York the municipal work is on a more limited scale than in our own country, but this is compensated for by the large number of voluntary agencies employing large staffs of highly trained workers and carefully coördinated in order to avoid overlapping.

The conduct of the welfare clinics, of which there are 94 in New York, differs little, if at all, from those in this country, the doctors attending twice a week and advising only on questions of diet and hygiene. The clinics are open to children up to 2 years of age, and not, as here, right up to the age of 5. The midwifery service of New York includes 300 licensed midwives, who attend 26 per cent. of the births. None of these, however, is a trained nurse. The midwives notify ophthalmia neonatorum and puerperal sepsis, but no other notifications are made. Doctors and nurses act as inspectors of midwives. The Maternity Centres Association takes a large proportion of the antenatal work in New York; maternity nurses are provided by this Association for a fee of £5, and the infant is visited up to six weeks of age. An important feature of welfare work in the United States is the establishment of special clinics which appear to have been brought to a high pitch of efficiency. Examples of these are the nutrition clinics, to which children suffering from malnutrition are referred from other centres; the heart clinic in New York, which deals with cases of actual or incipient heart disease in children under 12 years; the posture clinic, in which remedial exercises are taught and carried out for such minor orthopædic defects as flat-foot or knock-knees; psychological clinics for children from 3 years old and upwards; and, in Boston, a neurological clinic, where an elaborate system of muscle training by voluntary exercises has been instituted for infants and young children suffering from birth injuries, the sequelæ of poliomyelitis, and the like. Dr. Cassie draws attention to the somewhat anomalous position of the midwife in the United States. There is no training in midwifery apart from the simple maternity nursing included in the general training of a nurse, and the very existence of the midwife seems in many places, notably in Massachusetts, to be ignored. The maternal mortality-rate, doubtless partly in consequence of this attitude, is everywhere high—e.g., in New York the rate is 6 per 1000 live births, as compared with 3·9 in England and Wales.

Methods of infant feeding varied a good deal in the different places, but apart from the greater use made of thick cereal feeds and lactic acid milk, and the comparatively limited use of dried milk, no great differences were noted from the methods adopted in our own country.

CRAWFORD WILLIAMSON LONG.

THE Crawford W. Long Memorial Association has just unveiled a statue of Long in the Capitol at Washington, the ceremony taking place on March 30th last, the eighty-fourth anniversary of Long's discovery. It is particularly right that this great man should receive public notice because of the singularly modest and disinterested part which he played in the polemics which have marked discussions upon the introduction of anæsthetics. A sympathetic memoir of him will be found in the first volume of THE LANCET of 1912, written by Dr. Dudley Buxton, consulting anæsthetist at University College Hospital. The memoir fully makes out the claim of Long to be the pioneer of anæsthesia and the first to suggest and employ ether inhalations during surgical operations. Dr. Dudley Buxton says: "While disputants, claiming for themselves or their friends the plaudits due to great discoverers, rent the welkin with their angry cries and clamoured for a material solatium, one man, Crawford Williamson Long, reputed to be actually the first to produce artificial anæsthesia by inhalation of ether, was content to stand aside, calm and dignified, as one who strove to benefit his race while seeking for himself neither guerdon nor worldly honour." In dealing with the question of the rival claims to the honour of introducing ether to the medical profession, the founder of THE LANCET 80 years ago spoke with characteristic vigour: "Many persons have suggested certain sniffings and breathings, and have employed them in private in a few slight cases; but these we may pass by as unworthy of notice—certainly not detracting in the least degree from the praise and honour due to the American originator, whether that originator be Dr. Morton, Dr. Jackson, or Mr. Horace Wells, the last claimant." Only a few weeks after this pronouncement documentary evidence came to THE LANCET substantiating the claim of Horace Wells for the use of nitrous oxide gas for tooth extraction prior to the work of W. T. G. Morton, but at this time the name of Crawford Long was still unknown in England, and indeed was but little known in his own country. His reticence seems to have been due to his perceiving that his methods needed carefully working out, while he held it improper that experiments should be made upon any but suitable patients. When the successes of Wells, Charles Jackson, and Morton became known, with the result that a controversy arose between these three, it appears at the time to have occurred to no one that, while they could settle the second place among themselves, the first place belonged to Long. Dr. Dudley Buxton in his essay supplied a facsimile of a letter from Long dated Feb. 1st, 1842, in which he alludes to being "utterly out of ether" and to intending to use it for anæsthetic purposes in the future. This date is some two years earlier than any date claimed for the discoveries of the other three.

THE COLLEGE OF NURSING.

THIS week an appeal is being made to the medical profession to help in the endowment of the College of Nursing. There are many who will gladly respond to this appeal because it is an opportunity to express the admiration so widely felt for nurses and their work. None have a better chance of understanding the value and quality of that work than medical practitioners; none comprehend better the conditions of service and remuneration under which nurses still work; none therefore are more anxious to assist in anything that makes for their welfare. To ensure support from the medical profession it is, therefore, only necessary to show that the College of Nursing has a real function and fulfils a real need. When it was founded in 1916 its objects were these: to provide a central organisation for the nursing profession; to raise the standard of training and examination of nurses; to promote the higher education of nurses; and to attract to the profession the best type of woman. There are now 24,000 nurses on the College Register who have complied with the regulations for entry, and the College is recognised by the Ministry of Health as a training centre for the Health Visitors' certificate and is consulted on nursing affairs by Government departments and public bodies. There are 41 branches, seven residential and other clubs, and two convalescent homes at which members may stay at very small charges. Scholarships are awarded for post-graduate work; there is a Loan Fund which has been of assistance in many cases, and there is a special scheme for insurance against sickness and accident. The College's scale of salaries for all grades and branches of the nursing profession is being increasingly adopted by hospitals and employing authorities, and the College has been instrumental in obtaining an amendment to the Unemployment Insurance Act by which all trained nurses and nurses in training are exempted from its provisions, which were a considerable burden upon them. A Student Nurses' Association is a recent development, for the benefit of nurses in training for the general part of the State Register, and the work of the Public Health Section and the Sister Tutor Section are already well known.

The work of the College is steadily expanding. It is governed by a council elected by the members by a postal vote. There is no restriction on membership of the council, and at present there are a number of medical men upon it who are making the appeal referred to. The cost of management, they state, is nearly £5700 a year, and the deficit on each year is considerable, and has to be met out of the General Fund and the interest from the Endowment Fund, which now stands at £67,000. Although the College is in important respects comparable to the colleges of other professions, it is unlike them in that most of them have benefited by the endowments of their founders and by legacies. Apart from the gifts of Viscountess Cowdray, who presented the building near Cavendish-square, and has founded several scholarships and annuities, the College has had to rely on certain earmarked amounts subscribed by the public in the appeal for the Nation's Fund for Nurses and on the donations and subscriptions of its members. Over £35,000 has been subscribed by members and their friends, who have worked extremely hard to get it. By themselves they can hardly hope to secure the further £33,000 which is needed to bring the total up to the £100,000 required, and that is why the appeal is being made to the medical profession. Even the smallest subscriptions will be appreciated; they may be sent to the hon. treasurer, Mr. Comyns Berkeley, or direct to the College, Henrietta-street, W. 1. Largely by subscription in answer to personal appeals by the treasurer about £650 has already been collected, and we hope, if possible, to publish a list of donations in due course in order to further this excellent object.

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

CLXVIII.—THE TREATMENT OF LUPUS ERYTHEMATOSUS.

Lupus erythematosus still remains one of the most intractable and capricious of skin diseases. Its name is unfortunate and misleading, as it suggests a relationship with lupus vulgaris, from which it is quite distinct. Of its synonyms the most appropriate is erythema atrophicans, a name given to it by the late Sir Malcolm Morris, which more nearly suggests its nature than that by which it is generally known. Its treatment is best considered under two headings—namely, the treatment of the acute, disseminated type, and that of the more chronic, circumscribed, or discoid type, which constitutes about 80 per cent. of all the cases.

Rational treatment should be based on ætiology. Unfortunately, the ætiology of this disease still remains unsettled. In my opinion lupus erythematosus is not a pathological entity in the true sense, like psoriasis, and due to one specific cause, but is rather a morbid cutaneous condition, of the type of an erythema, which is persistent in character, tends to be succeeded by atrophy, and may be called forth in a predisposed individual by a variety of causes of a toxic or septic character.

Of the predisposing causes, the most important is a delicate condition of the skin, either from hereditary weakness, general morbid conditions, such as tuberculosis, or a weak peripheral circulation, the common situation of the lesions being largely determined by anatomical reasons, such as the stretching of the skin over bone or cartilage. The actual cause is the circulation in the skin of some toxin, either resulting from the impaired action of diseased organs, such as the kidneys or the liver, or possibly originating in some septic focus in the mouth, about the throat or bronchi, or in the alimentary tract. Local influences, such as cold, sudden changes from heat to cold, traumatism, insect bites, or local microbic action, have an important bearing in determining the localisation of the disease.

Acute Disseminated Cases.

General Measures.—These cases are so obviously toxic that their treatment resolves itself largely into an endeavour to discover the source of the toxæmia, and to deal with it on general medical principles. The patients are, as a rule, seriously ill, and require confinement to bed. In a fatal case recently under my care at Charing Cross Hospital, the toxæmia was found to be of streptococcal origin, the *Streptococcus longus* being recovered from the throat, which was in a horribly septic condition, and from the urine. After a prolonged illness death took place from acute septicæmia. In another case the eruption appeared in association with Bright's disease, from which the patient died. Other cases have been associated with alcoholism, cirrhosis of the liver, and rheumatism. Where a microbic origin is proved, the microbe being generally a streptococcus, injections of an autogenous vaccine should be tried, but their value is uncertain. Where the actual toxin is not discovered, and an appropriate antitoxin not available, various drugs are reputed to have an antitoxic action. Of these salicin and quinine have given the best results. Salicin should be prescribed in large doses of 15 to 30 gr. three times a day, and in a mixture containing also powdered tragacanth and peppermint water; a few minims of the tincture of nux vomica may be added to counteract the depressing action of the salicin. Quinine also should be given in large doses of 5 to 10 gr. It may be injected intravenously once a week in the form of the hydrochloride, gr. 5, dissolved in normal

saline solution 10 c.cm., but there is no great advantage in this method, and it occasionally causes shock.

Local Treatment in the acute cases consists of soothing the inflamed skin and endeavouring to reduce the erythema. The scaliness is, as a rule, slight, and requires no special attention. For the reduction of the erythema it is better to use lotions than greasy applications, which are heating; lotions containing lead and ichthyol are of most service. A favourite application consists of the glycerine of the subacetate of lead in water (1 in 8), and the ichthyol may be used in a 3–6 per cent. aqueous solution. The astringent action of the lotion may be increased by the subsequent application of a bland dusting powder. When the acute erythema subsides, and the patches become dry and scaly, a bland zinc cream may be substituted.

In acute cases the prognosis should always be guarded, for although the skin affection may sometimes disappear, either spontaneously or under suitable applications, the underlying toxæmia may sometimes lead to a fatal issue. As a rule, towards the end, in fatal cases, the eruption tends to subside.

Chronic Circumscribed Cases.

General Treatment.—In the chronic cases, though the local treatment is of paramount importance, general treatment must on no account be neglected. Any disturbance of the alimentary tract, disease of the kidneys, intestines, or other organs must be carefully sought for and dealt with. The diet should be regulated, and anything which tends to cause flushing, such as alcohol, coffee, rich foods, &c., omitted. A careful examination should be made for any septic focus, such as diseased tonsils, septic gums, or streptococci in the fæces. Benefit has been claimed from removal of the septic focus, and from injections of autogenous vaccines, but in my experience vaccine treatment is apt to be disappointing. Improvement in the lesions may follow a reaction due to an autogenous vaccine, but the reaction is not necessarily specific. Improvement has been claimed to follow injections of sterile milk albumin, and the intravenous injection of a typhoid vaccine.

All sources of local irritation, such as brilliant sunshine, over-heated rooms, cold winds, and violent exercise, should be scrupulously guarded against. Quinine and salicin, especially in cases associated with rheumatism, are also of service in the treatment of the circumscribed lesion, and their value may be enhanced by confinement to bed.

Local Treatment.—Since this affection is as easily aggravated as cured by local remedies, it is always advisable to begin treatment in a cautious and tentative fashion, and gradually to increase the strength of the applications according to the toleration of the patient. The two main indications are the removal of the scales and the reduction of the hyperæmia.

The scales should be removed daily, before the application of any lotion or ointment, by washing the lesions with soap, spirit lotion, on a piece of flannel, or, where the scales are particularly adherent, by rubbing in 3 per cent. salicylic acid ointment.

For the reduction of the hyperæmia the time-honoured calamine lotion is a most useful remedy, and its value can be increased by the addition of 2 per cent. of the liquor plumbi subacetatis. Its application not only reduces the erythema, but conceals and protects the patches by leaving a deposit of powder. It should be either dabbed on with cotton-wool or applied continuously for half an hour at a time on lint. Ichthyol, a valuable astringent, can be employed either as a 5 per cent. ointment in vaseline or as a lotion. In resistant patches it may be continuously applied in plaster form. Formalin ointment (5 per cent.) and adrenalin lotion (1 in 1000) are also serviceable, but are liable to irritate a delicate skin. Where the patches are of a fixed, resistant type, and covered by a thick adherent scale, stronger applications are necessary, such as painting the patches with contractile collodion containing 1 per cent. of salicylic acid or the application of a lotion of 10 per cent. resorcin dissolved in spirit, or 6 per cent. oxidised pyrogallic acid paste.

Caustic remedies, such as silver nitrate, carbolic acid, and corrosive sublimate, were at one time largely employed, but are better avoided because their action is so destructive as sometimes to be followed by unsightly scarring. Where the lesions are small good results have been obtained by multiple scarification, but great care and considerable practice are required to avoid scarring. Where patches are on the scalp all that can be hoped is to prevent, if possible, the spread of the diseased process, for, once a patch has occurred, the atrophy associated with it leads to permanent local baldness.

In addition to the chemical methods of treatment, certain physical and electrical methods may be employed, such as ionisation, refrigeration, ultra-violet light, X rays, and radium. Of these ionisation, with a solid zinc electrode, and refrigeration, with carbon dioxide snow, give the best results.

The *ionisation method* is simple. A small piece of lint is saturated in a 2 per cent. solution of sulphate of zinc and applied to the lesion; on this is placed a flat zinc block electrode, of suitable size, which is attached to the positive pole of a galvanic battery; the negative pole consists either of a metal cylinder, covered with chamois leather and dipped in saline solution, which is grasped by the patient, or a large pad held in contact with some part of the skin. A current of 2–5 milliampères is passed for about 15 minutes, the strength of the current being determined by the toleration of the patient. As a result of the exposure the tissue becomes blanched like parchment and remains so for a time varying with the strength of the current. If the exposure be not excessive there will be no subsequent reaction, but if it be too prolonged, or the current too strong, superficial ulceration may result. A single treatment may suffice to cause the involution of the patch, but, as a rule, several are necessary and should be given at intervals of not less than a week.

Freezing with carbon dioxide sometimes gives excellent results, especially in resistant lesions, but it must on no account be used where the disease is active and spreading. The applications should not be longer than 10 to 15 seconds, with medium pressure, since, especially in situations where the skin is thin and stretched over bones or cartilage, over-exposure may lead to superficial ulceration and scarring.

Ultra-violet light is of comparatively little value. I have found that the patches react more vigorously to the rays than the normal skin, and that, when the reaction subsides, slight improvement may follow, especially in lesions of the fixed chronic type, but I have never known the disease to disappear under this treatment alone, and I have known it to cause spreading.

X rays and radium have also been recommended, but the results from them are disappointing.

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NEW SUSSEX HOSPITAL FOR WOMEN.—At the annual meeting on March 15th of the New Sussex Hospital for Women and Children at Brighton—an institution entirely officered by women doctors—reference was made to the progress of cancer research carried on there in conjunction with work at three London hospitals. Miss Louisa Martindale, the senior surgeon, said that this was the first coördinated work of its kind in the country. Hitherto, cancer research had been done in individual hospitals, but now the same dosage of radium was being used by different surgeons at hospitals dealing with different classes of patients. To continue this promising work was one urgent reason for extending the hospital's accommodation at Brighton. Lady Cooper Rawson said that if an extension was built and a new ward with 30 beds was opened at once, there would still be a waiting-list. The number of in-patients treated during the year was 486, compared with 439 in 1924. Out-patients numbered 2553 as against 2471. The finances showed a sound position, the sum of £683 received during the year as payment for treatment given to members of the Sussex Provident Scheme being one of the main sources of support. The institution continued to pay its way.

Special Articles.

THE TUBERCULOUS COW.

CAN tubercle-free herds be kept at a profit and is it worth a farmer's while to keep them? How can the public be educated to demand clean milk? Why has the medical profession done so little to foster the demand? These are some of the questions raised at a conference of the "Grade A (Tuberculin-tested)" Milk Producers' Association held on March 23rd and 24th at the University of Reading.

Most of the problems discussed were primarily agricultural; but the endeavour behind them has been inspired mainly by doctors, and its success or failure is important to the public health. Therefore the opinions and difficulties of those who are trying to get rid of tuberculosis from their cattle deserve the sympathetic consideration of the medical profession.

On the first morning the conference met under the presidency of Dr. R. KING BROWN, medical officer of health for Bermondsey, who commended the effort to supply clean milk as part of the larger campaign for uncontaminated food.

Growing Enlightenment of Scotland.

Mr. J. KIRKWOOD gave an account of what was being done in Scotland. There, he said, as in England, there were five kinds of milk—namely, ordinary commercial, pasteurised, Grade A, Grade A (Tuberculin-tested), and Grade A (Certified). At the end of February, 1926, there were in Scotland 19 producers of Certified milk, 27 of Grade A (T.T.), and 15 of Grade A, and the movement was making rapid progress. Eight of the 11 county institutions in Lanarkshire were supplied with milk of the first two qualities, and in Aberdeen it was provided in all the fever hospitals and welfare centres. These were only two examples out of many, and it was noteworthy that the Milk Designation Order had made the ordinary farmer, and not the pedigree breeder only, take an interest in eradicating tuberculosis. The present names of the grades, however, were most unsatisfactory, as the public could not understand what they meant. Why should not the four safe kinds of milk be called A, B, C, and D? As it was, people naturally supposed Grade A to be the best obtainable, and unscrupulous dealers traded on this. Farmers who had rid their herds of tubercle at considerable trouble and expense were entitled to have this fact intelligibly stated to their customers. They also needed the helpful coöperation of medical officers of health rather than criticism from them.

Mr. J. M. CAIE (Scottish Board of Agriculture) said that ordinary milk in one of the Scottish cities cost 6*d*. per quart; Grade A (T.T.) fluctuated in price, but was usually about 2*d*. dearer; whilst Certified was sold at a flat rate of 1*s*. all the year round. That epitomised the problem. The demand for Certified milk was going up faster than the demand for the other grades, because the buyer who once abandoned ordinary milk thereafter insisted on the very best. In Scotland in June, 1925, there were 450,000 cows, and perhaps 1500 of them were giving graded milk. Doctors could do a great deal to stimulate demand, and demand would lower price.

Mr. D. SCOTT (Scottish Board of Health) said that until four years ago people considered one milk as good as another, whether it contained pus, tubercle bacilli, fat, or none of these things. At least the public nowadays knew that there was a difference, and to that extent grading had been a success. The names might not be ideal, but what were the alternatives?

Other speakers regretted that consumers were still so backward that they demanded warm milk in the morning and did not appreciate it properly cooled; and an animated discussion ended with a reply from Mr. KIRKWOOD, who found it hard to believe in the schedule of prices given by Mr. Caie and said that the demand for the higher grades of milk was greater amongst the poor than the rich.

The Education of the Farmer.

A paper by Mr. J. P. BLACKSHAW (Ministry of Agriculture) described the rapid progress of the last half century. British dairying, he said, was certainly not behind that of any other country, and the cause of cleanliness had been helped immensely by practical demonstrations at agricultural shows and farms, by classes for milkers, and by clean milk competitions. Last year there had been competitions in 33 counties in which over 15,000 cows were entered; competitors who were lukewarm at first had often ended by becoming producers of graded milk. All that they needed was a market, and it was the medical officer of health and the sanitary inspector who could do most to find one. Many of them did a great deal—as in Bermondsey, Newcastle, and Leeds—but there were many who did not. In Newcastle a gallon of tuberculin-tested milk was supplied daily for each 350 of the population.

Dr. STENHOUSE WILLIAMS said that in Reading one-sixth of the town's supply was of this kind.—Mr. J. A. HANLEY said that the M.O.H. for Leeds had made some sort of a competitive test obligatory on those who supplied institutions in the city.—Other speakers pointed out how easy it was for the producer to lose his keenness or to neglect personal supervision. He was apt to fight shy of the many rules and regulations, and if his standard did fail he should be gently treated and given every chance to get advice from the agricultural educational authorities of his county. It was a great mistake to take licences away before assistance of this kind had been offered.

The conference passed a resolution urging that this should never be done.

The Cost of Eliminating Tuberculosis.

Mr. V. LIVERSAGE dealt with the expenses incurred in starting a tubercle-free herd and their effect on the price of milk. Proper concrete flooring for the premises and a good water-supply were often heavy items, and he estimated the average loss on each cow that reacted to tuberculin at about £10. Extra labour was needed for the production of Grade A milk, which amounted to about 100 man-hours per cow per year. A number of estimates by farmers put the annual extra cost of keeping a tuberculin-tested herd at an average of £2 5*s*. 3*d*. per cow, and he thought that it usually worked out at between 2½*d*. and 3*d*. per gallon of milk.

Mr. Liversage's figures gave rise to a good deal of discussion. One speaker, drawing attention to the estimated profit of 13*s*. 4*d*. on each cow in the year, pointed out that in arriving even at this meagre figure nothing had been allowed for losses and the cost of labour had been taken at its lowest. The prospect was most melancholy. Another said that if the existing regulations were properly observed, nine farmers out of ten would have to embark on expensive alterations of their premises and the price of ordinary commercial milk would go up accordingly. Not all the expenditure, therefore, should be attributed to the cost of eliminating tuberculosis. All the same, it was obvious that a gallon of Grade A (T.T.) milk cost the producer at least 3*d*. more than a gallon of ordinary milk, and then there was the distributor to be considered as well. It was ridiculous to say that the farmer could do it more cheaply if only there were better management.

The Number of Reactors and the Advantages of Removing Them.

On March 24th the chair was taken by Dr. A. A. MUSSEN (M.O.H. for Liverpool), and the proceedings opened with a paper by Mr. W. L. LITTLE on the value of the tuberculin test to the dairy farmer. Out of 400 animals tested for the first time he had

[1] The last four of these are supplied only under licence. Grade A is milk which comes up to a reasonable standard of clean production; Grade A (T.T.) is clean milk from a tubercle-free herd; whilst Grade A (Certified) milk is similar to Grade A (T.T.), but is bottled at the farm to ensure even greater cleanliness.

found that nearly 38 per cent. were reactors. There was thus a good deal of loss to be faced in making a herd tubercle-free. On the other hand, there were definite advantages, for the cows would not be likely to suffer from sterility or mastitis; there would be no wasters; they would not eat so much as those affected by tuberculosis; and there was a growing demand for tuberculin-tested cows which enabled the farmer to sell them at £3 or £4 more per head. The meat inspector of Cork had recently said that 50 per cent. of animals slaughtered in that city were tuberculous, and it was an advantage to be sure that carcasses would not be rejected. Lastly, the tubercle-free cow had a greater expectation of life. No animal once reacting, said Mr. Little, should ever be given another chance. The tuberculin test rarely failed, and then only in animals not actively infectious at the time; and it was to be hoped that British cattle would eventually be freed from tuberculosis as were those of the Channel Islands.

The Secretary of the Association (Lieut.-Colonel C. MADDOCK, I.M.S.) read a paper by Mr. G. P. MALE in which he mentioned other advantages to the owner who got rid of reactors. There was no longer a fear that time and money would be lost owing to seizures of milk alleged to contain tubercle bacilli. No fresh animal, he thought, should be introduced into a herd of non-reactors until it had been tested, quarantined for six months, and tested again by the double method.

Dr. MYER COPLANS (interpreting for Prof. MAZÉ, of the Pasteur Institute) said that only 7 per cent. of Normandy cattle were found to react. They were more in the open air than English animals, but perhaps the Shorthorns of England were particularly susceptible?—Mr. LITTLE replied that tuberculosis was a disease of the sheds, and that was why the disease was so prevalent in England. In Canada only some 12 per cent. reacted.— Mr. CUMBER pointed out that this low figure perhaps applied only to those under 3 years old. Of young animals in this country probably not 5 per cent. would react, and it was quite erroneous to suggest that the Canadian cattle were more healthy than the English. —Dr. RALPH PICKEN (M.O.H. for Cardiff) said that he would put the number of tuberculous carcasses in Cardiff slaughterhouses at not more than 5 per cent. It depended on age and sex; the percentage amongst milch cows would be about 10–15 per cent.—A speaker from Devonshire remarked that not more than 2 per cent. of the cows in his county reacted.

Prof. G. H. WOOLDRIDGE gave an address of great interest, in the course of which he said that in introducing outsiders into the herd a medium course was desirable. No animal should be admitted straight away unless it came from another tubercle-free herd; one or two months' isolation was needed in case there was infection as yet undeveloped. Most of the troubles of owners were caused by cows being given the benefit of the doubt when there was one, and although there were border-line cases, no risks should ever be taken. No one breed of cattle showed special susceptibility to tubercle, but those which came from herds long immune were the first to succumb to infection. This was true also of human beings.

Many other speakers continued the discussion. Captain ROSS GRANT said that experience in Queensland showed that environment had very little to do with the infection. Arbitrary statements about percentage of reactors conveyed little; in Queensland it was found that less than 4 per cent. of bullocks reacted, but the figure for breeding cows (kept until the age of 8 or 9) was 30 or 40 per cent. Yet none of them had ever been near a shed, and they had been out in the sunshine all their lives. Housing had far less effect than was generally assumed. The real difficulty in this country was the disposal of the reactors. Obviously they could not be destroyed, and the consequence was that they were simply transferred to other herds. There was only one solution of the problem—to have two kinds of milk—namely, tubercle-free milk and *boiled* milk.

A Standard for Tuberculin.

At the suggestion of Prof. R. S. SETON a resolution was passed urging that a standard of potency and preparation for veterinary tuberculin for diagnostic purposes be laid down and that its use be restricted to medical and veterinary practitioners. The conference considered the present state of affairs exceedingly unsatisfactory.

The Growing Consumption of Graded Milk.

Mr. T. A. HOLE (Ministry of Health) said that the grading of milk was started by the Food Ministry in 1918, but had made little progress until 1922. In 1923 more exact standards were introduced and by the end of that year there were 144 licensed producers and 860 licensed distributors. At the end of 1924 there were 224 producers, and the number was steadily growing as the market grew better. There were now 200 tuberculin-tested herds and there were licensees in all but nine English counties, by far the largest number being in Berkshire, where the National Institute for Research in Dairying had been established since 1912. Altogether some 3,700,000 gallons of Certified and Grade A (T.T.) milk were now being produced annually, and the average consumer was now beginning to realise that the keeping of milk depended on its quality.

Dr. KING BROWN described the growth of the clean milk movement in Bermondsey. Practically all the milkmen there now sold graded milk at 1*d.* a pint more than the ordinary, and the borough was providing tuberculin-tested milk in welfare centres, and as extra nourishment for the tuberculous. At first there had been some talk of municipal distribution, which had had the effect of spurring on the milkmen to very efficient service. More than 1400 families in Bermondsey were now receiving Grade A (T.T.) milk and the standard was very high indeed. A count of 200,000 organisms (the legal standard) was unheard of; a count of 30,000 (the standard for Certified milk) was very rare indeed, and things had gone so far that a Bermondsey milkman whose milk went up to 10,000 would very likely be cautioned. A market had been gained simply by education and propaganda. Lectures were given in clubs, factories, associations, and schools, and a cinema film showing the production of clean milk (from the cow to the kitchen) was exhibited at street corners. There were also leaflets and picturesque handbills. An electric sign displaying some doggerel verses about milk had been most successful and the words had been eagerly learnt by all the children in the locality, who sang them with enthusiasm. The result was that the parents of every child in Bermondsey could not help knowing something, at any rate, about milk.

Dr. PICKEN said that no Grade A (T.T.) milk was on sale in Cardiff, and it was useless to encourage its use until there was an available source. Some 330 gallons of Grade A milk (about 3 per cent. of the whole) were coming into the city daily, but unfortunately about 100 had to be sold as ordinary milk. He had found that some 60 per cent. of commercial milk in Wales came up to the Grade A standard, though the figure was lower in summer. Cleanliness had steadily increased till last year, but since then there had not been improvement. One of the difficulties was that the public expected expensive milk to contain more fat, and they were disappointed when it did not. Graded milk producers must keep well below the legal standards of bacterial content, for the consumer was very critical; and they ought to be especially careful not to use cattle food which would give an objectionable flavour to the milk. Unfortunately the price of common milk was rising and it would be increasingly difficult to get people to pay more for a specialty.

Efficient Cooling.

Mr. W. A. HOY gave an account of his observations on the bacterial content of milk as it reached the distributor. What was needed, he said, was more

efficient cooling at the farm, with subsequent cold storage at a local depôt before despatch to the retailer.

Mr. W. DAVIES advocated the use of brine coolers on the farms. It was not sufficient that milk should be clean; it must also be cool. Once the public understood about graded milk, he said, there would be no difficulty in finding a market, and what was really needed to-day was an intensive campaign amongst members of the medical profession.

An official dinner was held in the hall of the University on March 23rd, at which Prof. MAZÉ replied to the toast of "The Visitors," proposed by Mr. S. R. WHITLEY. Dr. STENHOUSE WILLIAMS, of the National Institute for Research in Dairying, represented the University of Reading, to which a charter has just been granted, and replied on its behalf to a toast by Mr. A. T. LORAM. On the afternoons of March 23rd and 24th visits were paid to a number of farms in the neighbourhood of Reading and to the National Institute for Research in Dairying.

IRELAND.

(FROM OUR OWN CORRESPONDENT.)

Powers and Duties of Coroners.

A SELECT Committee of the Senate of the Irish Free State is at present considering a Coroners Bill, and recently heard evidence from Mr. J. J. Horgan, coroner of Cork, who spoke on behalf of the Coroners Association. The salaries of coroners, he said, were totally inadequate to the office—the more so, as they had to pay all their travelling expenses and also had to pay their deputies. A coroner, he thought, should be able to dispense with a jury, especially where an inquest was held in the house of a poor family, on whom the tramping in of a dozen men had a depressing effect. He suggested, and the Committee accepted the suggestion, that it should be a statutory obligation on the Civic Guard to report to the coroner in cases where death took place without medical attendance. The coroner should have the right to order the exhumation of a body without seeking the consent of the Minister for Justice. The question of the coroner having the right to call in a pathologist and pay him a proper fee was one of great importance. At present, moreover, he was empowered to allow no more than 5*s.* for the exhumation and reinterment of a body. He could not give a witness expenses beyond 2*s.*, and even then could only give such expenses to a poor person.

Wards for Paying Patients.

At the annual meeting of the Corporation of the Royal Victoria Hospital, Belfast, several speakers urged that a paying department should be provided for middle-class patients and the idea was received very sympathetically by the large audience. For a long time the medical profession in Belfast has been greatly interested in the project; its importance and even its urgency are generally recognised. Opinion seems to favour the provision of such a department in connexion with existing general hospitals, rather than the erection of a special and independent hospital, but the question is still open to discussion. The Royal Victoria Hospital is in the fortunate position of possessing about 19 acres of ground, situated in a favourable position, and offering ample opportunity for the erection of a block of paying wards. Seven acres of this has been given to the hospital during the past year by the City Corporation. The hospital has been going ahead in many directions and the extensions and additions which have been in progress for nearly three years are now practically complete. They comprise two new units containing 80 beds, three new operating theatres, two new lecture rooms in the extern department, increased accommodation for the ophthalmic, venereal, and dental departments, a new mortuary, and a new nurses' home. The approximate cost of these additions and improvements is estimated at £120,000. Most of the new additions are already in commission and the formal inauguration will take place in a few weeks.

SOUTH AFRICA.

(FROM OUR OWN CORRESPONDENT.)

The Training of Natives as Doctors to their Own People.

THE question of a medical training school for natives is occupying the minds both of officials of the Union Government and of those more directly concerned with native education. Foremost amongst the latter are the directors of the South African Native College, near Lovedale, Cape Colony. So far there has been no provision for training a native man or woman in the practice of medicine, for, although we have now two universities which give a complete curriculum and confer a South African degree, neither of them will admit a native to its classes. The Government is not unsympathetic towards the demand of the native for medical training, and the matter was referred to the Hospitals Committee whose report was published last year. Its findings were as follows:—

> "Your Committee is convinced that there is scope, and a distinct need in the native territories, for native doctors, working as far as possible under European supervision. The standard should be the same as for European medical practitioners, and any licence to practise should be restricted to native areas. Your Committee therefore recommends that the question be further investigated by Government, particularly in regard to the cost of such a proposal."

These recommendations have now been acted upon, and a special committee of inquiry, to consist of seven members, has been appointed to go into the proposal for the establishment of a training college for the training of natives in medicine and public health. The committee has been carefully chosen, and represents the Cape Town University, the Native Affairs Department, and the Health Department of the Union. The various provinces have each their own representative. Meanwhile the South African Native College, Fort Hare, has started courses in physics, chemistry, botany, and zoology with the object of saving one year's study overseas for those of their students who are taking their medical training in Great Britain, where all the medical schools are open to them.

The need for native practitioners amongst their own people is abundantly evident. At the present time there is an average of one hospital bed to every 1500 of the population. The Europeans are provided for in the ratio of one bed to every 400 persons, about half that of England, and less than one-third of the ratio obtaining in the United States. Government provides for the treatment of natives as part of their civil service, and it is intended that native practitioners should work under them as the Indian hospital assistant works under the civil surgeon in India. Throughout the Union to-day the district surgeon has an area of 100 miles and more to cover in the native territories. If he could be provided with two or three hospital assistants in charge of small branch hospitals the lot of the sick native would be greatly alleviated, and the spread of the knowledge of sanitation and personal hygiene would also become possible from these centres.

Hospital Deficiencies within the Union.

The reports of the Hospitals Inquiry Commission, published last year, is a strong indictment of the whole hospital system of the Union. The Provincial Councils of the four Provinces are responsible for the upkeep and administration of all hospitals and dispensaries within their borders. After full inquiry the Commissioners were unanimous in condemning the existing system, and strongly advocated that all health and hospital administration should come under the sole control of the Union Government. They

based their recommendation on the following facts. The out-of-date equipment and inadequate accommodation of nearly all the hospitals; lack of suitable provision for maternity cases, sick children, and cases of venereal disease; the neglect of early cases of tuberculosis and lack of accommodation for advanced cases; and the failure to provide adequately for the chronic sick. In this connexion the report says:—

"There are only three chronic sick hospitals in the whole of the Union—in none of these has provision been made for chronic sick children—a dire necessity all over the Union."

Finally the report points out that there are, in the whole Union, no adequate dental services for either children or adults; no neurological department at any hospital; no institution for the treatment of crippled children; no provision for medical treatment of such children as the medical inspectors of schools may recommend for treatment. A motion is now before the Union Parliament that the Government should give effect to the report of the Hospitals Inquiry Committee as soon as possible, the main recommendation being that the hospitals should be taken out of the control of the Provincial Councils and handed over to the Union Department of Health.

Defective Transvaal Children.

A report on the medical examination of schoolchildren in the Transvaal shows the existence of a large proportion of physical defects, most of which are attributed to parental neglect, direct or indirect. Of the 15,000 children examined by authority of the medical inspector of schools, 7500 were found to be suffering from minor defects. Malarial children were being robbed of Government quinine supplies by their parents; there were about 75 per cent. of dental defects, and 800 children needed attention for ear, nose, or throat. The children were all treated free under the clinic system established at Johannesburg for children of indigent parents.

The South African Medical and Pharmacy Bill, long held over, is to be re-introduced into the Union Parliament at the end of the present session.

Dr. S. G. Campbell, who died on March 12th at the age of 65, was one of Durban's leading citizens. He was at one time president of the local medical council, and was responsible for the foundation of the Technical College.

Dr. Wallace Haworth, entomologist to the Administration of Southern Rhodesia and late acting director of the laboratory at Dar-es-Salaam, East Africa, died on March 14th as the result of injuries received in a motor accident.

PARIS.

(FROM OUR OWN CORRESPONDENT.)

A Filter-passing Virus in Tuberculosis.

IN pursuance of their work on the virus of tuberculosis Dr. Fernand Arloing and Dr. A. Dufourt, of Lyons, have published some observations on a child born prematurely at the seventh month whose mother suffered from advanced pulmonary tuberculosis. This child was isolated at once and was given every care, but died at the end of a month after losing a fifth of its weight. On examination no obvious tuberculous lesion was found, though there were a few tubercle bacilli in the mesenteric glands. A filtered extract of the principal viscera had no effect when injected into a guinea-pig, but subcutaneous injection of a filtered extract of the mesenteric glands produced tuberculisation of the animal leading to emaciation and death. There is a remarkable similarity between this observation on a human being and previous experimental results; they obviously have an important bearing on the inheritance of tuberculosis. According to Dr. Arloing and Dr. Dufourt there is in the new-born a special pathological condition, not yet understood, due to a filterable virus of tuberculosis being passed through the placenta. Some of the obscure wasting conditions, hypotrophies and atrophies of childhood ought probably to be placed in this group.

Medical Practice by a Chiropodist.

A well-known Parisian chiropodist has just been had up for illegal medical practice. The tribunal learned that he had been using a scalpel and caustics in the treatment of warts, and adjudged that the use of these agents was the prerogative of medical men. The complainants, a local association of doctors, were accordingly awarded 300 francs damages, and a fine of 100 francs was inflicted.

Diabetes and Insulin.

Insulin has entirely altered the prognosis of diabetes, and its late results are as remarkable as its immediate effects. Prof. Marcel Labbé estimates that half the subjects that he has treated would have died in coma but for insulin. Unfortunately, tuberculosis is common among diabetics in France and insulin has no effect in hindering its development. Furthermore, those who are treated with insulin, although greatly helped, are still very delicate and run the risk of complications; they have to be kept under careful observation, and none of them can be considered really cured. Most patients, Prof. Labbé considers, show a progressive aggravation of the diabetic process, which calls for larger and larger doses of insulin; but the evolution of the disease is made considerably slower.

New Academicians.

The two vacant seats at the Académie de Médecine have been filled by the election of Prof. Georges Dumas and Prof. A. Couvelaire. Prof. Dumas, who was born in 1866, occupies the chair of experimental psychology at the Sorbonne and the chair of pathological psychology at the Institute of Psychology. During the war he rendered good service as physician to the Neuropsychiatric Clinic and since then he has been on several important missions to America. His books on the intellectual states, grief, joy, and laughter, and on the confusional amnesias have been much appreciated. Prof. Couvelaire was born in 1873 and is professor in the Obstetric Clinic of the Faculté de Médecine at Paris, in which position he succeeded his father-in-law, Prof. Pinard. The Académie des Sciences has elected Dr. Jean Charcot, son of the famous neurologist of the Salpêtrière. Dr. Charcot studied medicine but afterwards became an explorer, and has published valuable scientific observations on the South Polar regions.

Production and Sale of Pacifiers Prohibited.

Prof. Pinard, who is well known as a champion of puériculture, has succeeded in persuading the Chamber of Deputies to prohibit the manufacture and sale of the *sucette* (dummy or pacifier) on the grounds that this device deforms the mouth, introduces infection, and may easily prove fatal when aspirated into the larynx. Its baneful effects have been discussed more than once during the past year at the Faculté de Médecine, but hitherto the conditions of the labour market have prevented any active steps, for the manufacture of these dangerous utensils serves to support a large community just outside Paris. The Bill was approved mainly because of a stirring appeal for reduction of the French child and infant mortality. An interval of three months has been allowed for the readjustment of the industrial concerns affected.

The French Society for the Encouragement of National Industry has just awarded its highest honour to the League of Red Cross Societies, in recognition of the importance of the League in the peaceful coördination of international interests.

About 100 Danish doctors have been visiting France and are now cruising in the Mediterranean. During their stay at Paris they opened a Danish nurses' home which is the first headquarters established in France for the Danish medical and nursing professions.

A series of lectures and demonstrations, called Journées Médicales de Paris, is to be held at the Grand Palais from July 15th to 19th, inclusive. Among those who will give lectures and demonstrations are Calmette, Putti (of Bologna), Bensaude, Sicard, Balthazard, Madame Curie, and others. The membership fee will be 50 francs, and particulars may be had from the Secretaire-Général, Journées Médicales de Paris, 18 rue de Verneuil.

The French National Congress on Hygiene will be held at the Pasteur Institute, Paris, during the second fortnight of October. The subjects announced provisionally for discussion include the French immigration problem, the preservation of food by cold, and the part assignable to official hygienists in the anti-tuberculosis campaign.

Public Health Services.

REPORTS OF MEDICAL OFFICERS OF HEALTH.

THE FIRST REPORT FOR 1925.

Dr. A. T. Nankivell's first report for Plymouth is also the first report which we have received for the "survey" year of 1925. He is able to record valuable work, since he took up his appointment, in the coördination of the public health service and in the institution of close coöperation between the various departments. This is shown graphically in a table. Dr. Nankivell indicates many of the needs of Plymouth, and it will be interesting to see how many of these needs his council has been able to provide before the advent of the next "survey" year of 1930.

The following are some of the principal statistics for the year 1925: Population, 211,078; birth-rate, 18·1; death-rate from all causes, 12·2; death-rates per 1000 of the population, from tuberculosis 1·06, from cancer 1·36, from respiratory diseases, with influenza, 2·3; and death-rates per 1000 births, neonatal mortality 30, infant mortality 63, maternal mortality from childbirth 4·7. Dr. Nankivell deals fully with the aim of the health service, the public health organisation, the history and natural, geological and social conditions of his area. Among the advantages of Plymouth he instances the large amount of bright sunshine (the record for 1925 was 1795·5 hours as compared with an average of 1666), and the fact that, owing to geological features and contours, the somewhat heavy rainfall (39·11 inches in 1925, or about 3 inches above the average) is speedily drained off. A chart shows that though the total infant mortality has been reduced from the neighbourhood of 100 to the neighbourhood of 60 during the last ten years, the neonatal mortality has remained almost stationary. In spite of natural advantages, pneumonia and bronchitis show a heavy death-rate, and Dr. Nankivell hopes before next autumn to be able to supply the doctors in the Three Towns with a vaccine which will give some protection from these complaints. Compared with other garrison and seaport towns, Dr. Nankivell thinks that Plymouth is relatively a sober borough. The ship used as a small-pox hospital has been sold to a ship-breaker, and negotiations are in progress for the use by the borough of the small-pox hospital of the Plymouth rural district.

Dr. Nankivell would like to see every medical member of his staff engaged in some research work, and during the year some work has been done with regard to the silica contents of dust from different towns and as to the use of the Dick serum in the treatment of scarlet fever. The two gathering-grounds of the water-supply are moorland and well protected from contamination. The water is very soft but has no action on lead. Bacterial analysis shows the presence of *Bacillus coli*, and Dr. Nankivell suggests that these are brought on the feet of seagulls from the sewage outfalls or from one of the tips. One would have thought the "droppings" of the seagulls a more likely explanation. About two-thirds of the practitioners of Plymouth who replied to a questionnaire as to the prevalence of goitre expressed the opinion that the condition was very prevalent. This is somewhat surprising in view of the generally held opinion that proximity to the sea and the iodine borne by the sea-spray act as protectives. Dr. Nankivell condemns the dumping of the refuse in the sea and the use of refuse tips in two localities. He would like to see all the refuse dealt with by a proper destructor or pulverising plant.

Many of the houses in the Three Towns, built more than 100 years ago, can only be dealt with adequately by reconstruction schemes, and three such schemes have been submitted to the Ministry of Health for their approval. The council of Plymouth have utilised the section for repairing houses in the default of, and at the cost of, the owners to the extent of £5515. Dr. Nankivell points out that there is no remedy in the case of thriftless and unintelligent persons who take no care of the houses in which they live. In Holland, he says, bad tenants are taken to a segregation camp and kept there under discipline until they are reformed—with admirable results. The shortage of houses has led to overcrowding and the herding of more than one family in houses only intended for one family. Altogether the Plymouth council have erected 1191 houses for the use of the working classes. During 1925 186 new municipal houses were made ready for tenants, and at the end of the year 192 were in course of construction. Apart from municipal houses 200 new houses were completed and 286 were under construction at the end of the year, in addition to 40 houses built by the Astor Trust. The present public abattoir is quite inadequate, and a report made at the end of the year states that "from the point of view of public health and decency this is not a suitable site for our abattoir and a real effort should be made to move this objectionable trade to the outskirts of the borough."

An extensive outbreak of food poisoning occurred at the workhouse in April. Three hundred persons out of a total population of 750 were affected, fortunately with no deaths. The chief cook was found to be a carrier of bacilli resembling *B. suipestifer*. The use of Dick-Dochez serum for severe cases of scarlet fever gave encouraging results at the hospital, and immunisation against diphtheria was successfully practised in the case of outbreaks at two institutions during the year. Dr. Nankivell is optimistic as to the possibility of protecting all infants from diphtheria, thus enabling the diphtheria wards to be closed. A scheme is under consideration for an orthopædic hospital at Swilly for the treatment of crippling from rickets, tuberculosis, and poliomyelitis. For the treatment of non-pulmonary tuberculosis Plymouth is at present entirely dependent upon outside institutions. A sanatorium is also needed for intermediate and advanced cases of tuberculosis in females. Antenatal clinics are only working on a small scale. Thus there were 3832 births and 312 mothers attended the antenatal clinics. Up to April, 1925, there was only one school dentist. Since that date there have been two, but Dr. Nankivell calculates that two school dentists are only able to do about one-third of the work which ought to be done. The school medical service has assumed control of the orthopædic clinic and all arrangements for supplying remedial apparatus. The school medical officers visit the clinic weekly or oftener and the consulting orthopædic surgeon once a month. The two open-air schools have accommodation for about 150 each; but many improvements are overdue at both schools. Oysters are cultivated within the jurisdiction of the Plymouth Port Sanitary Authority. The Yealm beds at Steer Point are used for relaying purposes, but the shell-fish in the Tamar and Lynher are liable to sewage contamination from Saltash and are only allowed to be sold for re-stocking purposes.

The report concludes with a number of interesting tables and a copy of a leaflet on cancer, which has been widely circulated in Plymouth.

ENCEPHALITIS LETHARGICA IN MANCHESTER.

A VALUABLE monograph on sleepy sickness by Dr. W. St. Clair McClure accompanies Dr. R. Veitch Clark's recently issued report on the health of Manchester for the years 1923 and 1924. In 1919 10 cases were notified, and in the following years 31, 19, 9, 36, and 244. The 36 cases notified in 1923 were widely distributed over the city, and no connexion could be traced between them. Sixteen of them proved fatal. During December, 1923, four cases occurred in four districts. In January, 1924, there were 21 cases in 15 districts, and thereafter the whole city was involved. Persons of all ages were attacked, but the incidence was heaviest under the age of 20. The sex distribution was nearly equal, 129 patients being males and 115 females. The average case fatality was about 20 per cent.; the death-roll is not yet complete. No occupational influence could be traced, although unfavourable environment showed some effect. There was nothing suggestive in the way of illness among the 1207 family contacts, except perhaps two cases of hiccup. No association could be made out with influenza; an outbreak of this occurred after the encephalitis had subsided, and there were ten cases of influenza among the 1207 encephalitis contacts. Influenza did not invade the households attacked by encephalitis, and no correlation was shown between the two diseases during the past five years in Manchester. An epidemic of hiccup preceded the encephalitis epidemic of 1924. The attacks of hiccup lasted from three to ten days without other symptoms, except drowsiness in a few cases. With two exceptions the households attacked by encephalitis were not affected by hiccup. Further, hiccup was not a common symptom of the encephalitis patients, and was only noted in eight of the notified cases. There were no definite multiple cases in a household, but in seven cases another member of the family had previously suffered from suspicious symptoms. The following was the percentage frequency of certain symptoms:—

	Per cent.		Per cent.
Initial vomiting	10	Paralysis of one or more cranial nerves	40
Initial headache	36	Double vision	44
Pronounced lethargy ..	70	Nystagmus	10
Insomnia and delirium ..	30	Initial choreic twitchings	31

The fundus oculi was examined in 58 patients; in one case there was engorgement of the papillary veins, in the remainder nothing abnormal. Diplopia was the outstanding feature at the onset in a considerable number, and in some cases diplopia and some drowsiness were the only symptoms. The actual notifications received were 282, in 38 of which the diagnosis was subsequently revised as follows: Influenza, 5; typhoid, 1; tuberculous meningitis, 5; cerebral abscess, 2; cerebro-spinal fever, 1; chorea, 2; tonsillitis, 2; broncho-pneumonia, 4; muscular rheumatism, 2; gastritis, 3; anæmia, 2; senility, 2; and others, 7. As a rule the diagnosis was unmistakable. In doubtful cases examination of the spinal fluid was of value in excluding meningitis. It is still too early to determine the final result of the 1924 cases, but of the 50 cases notified in 1920 and 1921 28 have died; 5 are totally incapacitated and becoming completely helpless; 4 are able to do housework only; and only 13 are able to follow their employment or attend school, recovery being complete in 7 of them.

INFECTIOUS DISEASE IN ENGLAND AND WALES DURING THE WEEK ENDED MARCH 27TH, 1926.

Notifications.—The following cases of infectious disease were notified during the week:—Small-pox, 178 (last week 189); scarlet fever, 1586; diphtheria, 1005; enteric fever, 46; pneumonia, 1183; puerperal fever, 45; cerebro-spinal fever, 6; acute poliomyelitis, 1; encephalitis lethargica, 37; dysentery, 6; ophthalmia neonatorum, 119. There were no cases of cholera, plague, or typhus fever notified during the week.

Deaths.—In the aggregate of great towns, including London, there were 7 (2) deaths from enteric fever, 121 (49) from measles, 9 (3) from scarlet fever, 66 (4) from whooping-cough, 47 (16) from diphtheria, 38 (11) from diarrhœa and enteritis under 2 years of age, and 136 (27) from influenza. The figures in parentheses are those for London itself. The notified deaths from influenza number the same as last week. The number of deaths from measles is the highest recorded for the quarter.

INFLUENZA IN GLASGOW.—67 deaths from influenza were reported in Glasgow during the week ended April 3rd, as against 24 and 7 in the preceding weeks; also 50 more deaths from respiratory diseases than in the preceding week. The public health authority is providing for the isolation of many of the severe cases of influenza.

The Services.

ARMY MEDICAL SERVICE.

Assistant Director of Hygiene.—Lt.-Col. and Bt. Col. P. H. Henderson, R.A.M.C., relinquishes his appt. at the War Office.

ROYAL ARMY MEDICAL COLLEGE.

Professor.—Lt.-Col. and Bt. Col. P. H. Henderson, R.A.M.C., vice Bt. Lt.-Col. J. A. Anderson (vacated).

ROYAL HOSPITAL, CHELSEA.

Deputy Surgeon.—Capt. G. S. McConkey, R.A.M.C., vice Lt. J. G. E. Vachell (vacated).

ROYAL ARMY MEDICAL CORPS.

Lt.-Col. and Bt. Col. H. E. M. Douglas, from R.A.M.C., to be Col., vice Col. F. F. Carroll, to half pay.

The undermentioned Majs. to be Lt.-Cols.: H. H. J. Fawcett, vice Lt.-Col. P. H. Falkner, to retd. pay. J. D. Richmond, vice Lt.-Col. and Bt. Col. H. E. M. Douglas (promoted).

ARMY RESERVE OF OFFICERS.

Maj. C. Cassidy ceases to belong to the Res. of Off. on account of ill-health.

TERRITORIAL ARMY.

Capt. O. H. Mavor resigns his commn., and is granted the rank of Maj. Lt. R. M. Savege to be Capt. (Prov.).

ROYAL AIR FORCE.

Flying Officer A. Dickson is granted a permanent commission in this rank.

INDIAN MEDICAL SERVICE.

Temp. Lts. to be temp. Capts.: Ram Chand Gaulatia, Chuni Lal Katial, Ram Mansoor, Santosh Kumar Ganguli, Samuel Mufty, Amar Nath Chopra, Chuni Lal Bhola. V. A. Edge to be Lt.

Capt. Saravanamuthu Thambiah relinquishes his temp. commn.

SUSSEX PROVIDENT SCHEME.—The growth of the scheme during 1925 was described at the annual meeting at Brighton on March 20th as extraordinary. The number of groups had increased during the year from 177 to 229, and the number of subscribers from 9955 to 12,428. At the end of 1924 the number of dependants coming under the scheme was 15,306, making the total 25,261, and at the end of 1925 dependants numbered 18,573, making the total 31,001. The total increase was thus 5740 in the year. Other figures given by Major P. A. S. Crawley, the chairman, equally testified to the success of the scheme. In-patients in 1925 cost £5272 and out-patients £1104, a total of £6376; 843 members obtained free special in-patient treatment for 14,958 days, and 2705 members obtained free special out-patient treatment for 12,966 attendances. The number of in-patients was 224 more than in 1924, and the number of out-patients 815 more. The money given to the hospitals was £6376 as against £5501 in 1924, and since the scheme was inaugurated in 1922 it had paid £16,164 to the hospitals. Major Crawley did not think the hospitals could afford not to support the scheme. Generally speaking, the hospitals were very keen, and wished to do everything in their power to support it, but unfortunately a good many omitted from their annual reports any appreciation of the work of the collectors and committee. Although the scheme was run on business lines, it was not a commercial undertaking, and there was no profit to anybody except the hospitals who got the money and the workpeople who got the treatment. The costs of administration were extremely low (£534), and the hospitals had received 81 per cent. of the total cost of their members. That might not have been as much as the executive at one time hoped, but it was as much as any hospital could expect. Subscription to the scheme was very low, and if they could pay over four-fifths of the cost the hospitals had nothing to complain of.

Correspondence.

"Audi alteram partem."

DIABETES, A RECOVERABLE DISEASE.

To the Editor of THE LANCET.

SIR,—My experience with four cases of diabetes mellitus in private practice may be of interest in connexion with the question raised in your issue of March 27th by Dr. G. H. Percival as to what recovery is possible in this disease. Though the cases are few in number, they have been under observation since 1924. Further, these patients have not been kept in bed at any time, but have continued their normal activities, so that the factor of muscular work cannot have influenced their sugar tolerance.

The principle I have worked on from the first has been the same as that practised by Dr. Percival—namely, physiological rest to the damaged pancreas—but I have got a step further and aimed at maintaining the patient for long periods in a state bordering on hypoglycæmia. After ascertaining by a 24-hours fast and a ladder diet that the patient is unable to utilise fully a diet of 1000 calories without glycosuria, I put the patient on an adequate diet of 1600 calories or so, and commence injections of insulin. I start with 5 units twice a day and increase the dose steadily, till slight hypoglycæmic symptoms appear. I then maintain the dose at that level. After a period of time varying with each patient, it is found that the hypoglycæmic symptoms become more pronounced. The dose is then diminished unit by unit, always waiting for constant and fairly pronounced hypoglycæmia to appear before lessening the dose. I continue this system until a minimal dose of 4 units, two hours before the principal meal, gives rise to symptoms. I then discard insulin and keep the patient on a regulated diet. Subsequently, if no sugar reappears in the urine, the diet is allowed to approximate to the normal. All patients are, of course, ordered to carry sugar whilst having insulin and instructed to eat some if muscular weakness appears as a symptom of hypoglycæmia. Slight symptoms are disregarded.

The following are abbreviated notes of the cases.

CASE 1.—Female, aged 41. In February, 1924, acute inflammation of maxillary antrum occurred and patient was unable to spare time for more than drainage of antrum through canine fossa under gas. Drainage maintained by vulcanite plug. Glycosuria discovered in May, 1924. Specific gravity of urine 1035. Hard work was a necessity and a diet of 1800 calories was required in consequence. Insulin started in May and during June and July 40 units of insulin twice a day were required to produce hypoglycæmia. This was a great inconvenience and expense. In August chronic discharge from antrum ceased completely and plug was therefore removed and sinus allowed to close. In September 20 units of insulin only were required to produce hypoglycæmia. Insulin stopped in July, 1925. Glycosuria has remained absent ever since. Blood-sugar in July, 1925: Fasting, 0·126 per cent.; one hour after 50 g. of glucose, 0·197 per cent.; two hours after, 0·110 per cent.

CASE 2.—Female, aged 50. Glycosuria discovered in July, 1924. Not controlled by diet. Blood-sugar: Fasting, 0·139 per cent.; one hour after 50 g. glucose, 0·222 per cent.; two hours after, 0·225 per cent. Ten units of insulin b.d. was found sufficient to cause hypoglycæmia. In March, 1925, insulin was stopped. Blood-sugar: Fasting, 0·110 per cent.; one hour after, 0·178 per cent.; two hours after, 0·158 per cent. Has remained free from glycosuria ever since.

CASE 3.—Male, aged 59. Glycosuria not controlled by diet. October, 1924, insulin 10 units b.d. required. March, 1926, insulin stopped. Has remained free from glycosuria up to present time.

CASE 4.—Male, aged 71. Had had diabetes for over six years accompanied by neuritis. Both knee-jerks were absent. In October, 1924, hypoglycæmia induced by 17 units b.d. Knee-jerks returned by end of the month. In April, 1925, 13 units only were required once a day. Owing to an attack of agonising tic douloureux, treatment of diabetes became disorganised, and a new start had to be made in July with 20 units b.d. Blood-sugar then was: Fasting, 0·173 per cent.; one hour after 50 g. glucose, 0·210 per cent.; two hours after, 0·240 per cent. In January, 1926, his dose was 8 units once a day. Blood-sugar was: Fasting, 0·163 per cent.; one hour after, 0·250 per cent.; two hours after, 0·175 per cent. I still hope that insulin may be discarded eventually in this case.

These four cases are entirely unselected. In none of them could the glycosuria be abolished by diet alone. In all of them great improvement in sugar tolerance resulted from the treatment, and in three of them insulin has been discarded and the glycosuria has not returned, though the patients enjoy a satisfying and varied diet. Incidentally, I think I have proved that it was justifiable to ignore the numerous warnings from eminent authorities that appeared in the medical press in 1924 on the subject of insulin dosage and the dangers of hypoglycæmia.

I am, Sir, yours faithfully,

Bridlington, March 31st, 1926. P. D. H. CHAPMAN.

THEORY AND PRACTICE IN RELATION TO THE TREATMENT OF CANCER WITH LEAD.

To the Editor of THE LANCET.

SIR,—Since the meeting at the Medical Society of London on March 22nd hopes have been expressed by my friends that I would refute this or that statement after having had an opportunity of looking up the papers concerned, for, at the time, not having them with me, I had to be content with a general disavowal or an apology. I am, however, extremely loth to say anything more. Dr. Adami has already shown [1] how perverted certain criticism was, and how easily refuted. What he has said applies to nearly every adverse statement made in regard to our methods, and to the alleged "sloppiness" of our publications. Nor shall I be so ungracious as to ask for the correction of the one or two small verbal mistakes made in the excellent accounts of the meeting given by the medical reporters present. It was better that the accounts of such a meeting should be compiled by independent recorders rather than based on the usual abstracts sent in by the speakers.

There is, however, one matter to which, with Mr. Duncan Fitzwilliams's concurrence, I should like to refer. It will be remembered that Mr. Fitzwilliams made great play with a vivid description of a letter he said he had received from me—a letter which he thought illustrated bad faith on my part. In my reply, I ventured, from memory, to deny ever having dictated such a letter, and I suggested what I had probably written. Mr. Fitzwilliams, it will be recalled, then rose in his place and contradicted me. Thirty-six hours later I received the following letter from him:

"I am so sorry and I apologise most humbly for having contradicted you in what you recollected of having written to me.

"Last night I asked my secretary to look up your letter but left the house in a hurry and did not take it with me—it was lying on my desk when I came home and it is exactly as you said, you have put my name down for notification for sometime perhaps in April. I visualised your letter as something quite different and having got it in my head I have not the vaguest idea with what I have mixed it up—I am indeed sorry.

"Let me add my congratulations on the success of your meeting last night. I know perfectly well from what I had heard that you had met a not too friendly audience, and that you carried them completely with you must be a very great satisfaction to you.

"I shall look forward with great pleasure to seeing you in April."

This is the letter of a gentleman. Nevertheless, such mistakes should be avoided. Confident assertions and reassertions may produce an impression on an audience which is not always removed by a declaration of the truth at a later date. I feel sure that when Mr. Fitzwilliams comes to see us in a few weeks' time, so honourable a critic will realise and confess that we have neither magnified the dangers and difficulties,

[1] Brit. Med. Jour., 1926, i., 594.

nor over-estimated the results we have obtained. Be this as it may, he will receive a cordial welcome, as have all those who during the last few years have visited us.—I am, Sir, yours faithfully,

Liverpool, March 28th, 1926. W. BLAIR BELL.

EMETINE IN THE TREATMENT OF HEPATIC ABSCESS.

To the Editor of THE LANCET.

SIR,—Having operated on 167 cases of hepatic abscess and seen many others, I should like to comment on Dr. Hodson's letter with Dr. Manson-Bahr's reply thereto which appeared in your issue of March 27th. Dr. Hodson divides his letter into sections :—

1. *Pathology*—and therein states that "People obsessed with the pyogenic abscess idea find it difficult to believe that the absorption of the contents of 'hepatic abscesses,' large and small, is possible." In my experience it is possible, but rarely occurs.

2. *Diagnosis.*—I do not think it is generally accepted that aspiration is necessary for the diagnosis of a liver abscess. Dr. Hodson goes on to quote a case in which death occurred from rupture of the abscess two hours after treatment was begun. Presumably aspiration was not employed ; if this trifling operation had been performed would not the rupture with fatal results been prevented ? I have a vivid recollection of a case which came into hospital at the end of a long and hot morning's operating which I postponed until the next day ; unfortunately the abscess ruptured in the night with fatal results. I still feel that I was guilty in not at least giving the patient a chance by aspirating at once.

3. *Treatment.*—There I am absolutely opposed to Dr. Hodson's views ; in my previous papers I think that I have proved that aspiration plus emetine does cure in "the quickest, the most certain, and the most humane way possible," as opposed to emetine alone.

Time after time I have had a patient on the table in pain and suffering the utmost discomfort, and after an injection of cocaine performed a painless aspiration and watched the patient's drawn expression gradually disappear as the pus was withdrawn. It is astonishing, too, what an amount of pus may be found with few physical signs. My experience is against the statement that 25 per cent. of the abscesses are multiple.

I agree that emetine, gr. i., on 12 successive days is not the best way of administering the drug, but my views in detail on the subject can be found in THE LANCET of Nov. 15th, 1924, p. 1008. My experience is also against the statement that the larger the abscess the easier is it to cure with emetine alone ; in this respect I entirely concur with Dr. Manson-Bahr's reply—in fact, with all of it.

I am, Sir, yours faithfully,

E. OWEN THURSTON, F.R.C.S.,
Lieut.-Col., I.M.S.

Budleigh Salterton, March 28th, 1926.

THE GENERAL MEDICAL COUNCIL AND SPECIALISTS.

To the Editor of THE LANCET.

SIR,—The suggestion contained in Mr. Joseph Griffith's valuable letter appearing in your issue of March 20th that the General Medical Council should insist on a standard of training and attainment for specialists and should keep a register of such specialists, is one which—as regards the registration of specialists—I advanced in your columns two years ago.[1] I then pointed out that the accessibility of such a register to the general public was a matter of prime importance, the point on which I laid special emphasis being the difficulty under present conditions that the public experience when they desire to consult a specialist, as they have no data on which to form an opinion except their recognition of names that have appeared in the lay press as having been in attendance on some distinguished patient. I drew attention to the fact that, whereas as regards the majority of diseases many of the public may perhaps be content to accept the advice of their family doctor or of friends in their selection of a specialist, that this is not true of sufferers from venereal disease, who are loath to seek such advice, with the result that they are driven either to attend a public clinic or to seek the advice of a chemist in a district where they are unknown. Owing to this difficulty in obtaining the names of reliable specialists the patient often postpones his visit to a doctor until much valuable time has been lost. An authoritative register of adequately tested specialists would, therefore, be of special value to sufferers from venereal disease and appears to be urgently required.

I am, Sir, yours faithfully,

H. WANSEY BAYLY.

Harley-street, W., March 26th, 1926.

[1] THE LANCET, 1924, i., 464, 873.

FACULTY OF SPEECH.

To the Editor of THE LANCET.

SIR,—With reference to the annotation in your issue of Feb. 6th, p. 299, on a paper of mine dealing with the Intuitive Capacity of Children to Understand Spoken Language, I am of the opinion that the word "instinct" as applied to the faculty of speech is a misnomer, an instinct being an elementary impulse incapable of further analysis, whereas the faculty of speech is a complex mental process capable in part of analysis and consisting of at least five factors :—

1. The capacity to hear spoken sounds.
2. The capacity to recognise the component words of phrases and sentences.
3. The ultimate capacity to comprehend the meanings of spoken sounds.
4. The capacity to store in the memory both the sounds and meanings of words.
5. The capacity not only to reproduce words—i.e., to articulate—correctly, but to use them in their correct senses.

The question how speech is acquired by infants and children depends therefore largely upon the solution of the third of the factors mentioned above—i.e., how the meanings of words are comprehended by them.

The writer of your annotation states that "meaning is indicated or suggested to the child *in some manner other than speech.*" With regard to verbs of "action" and to the names of objects it is easily understood how meaning is indicated or suggested, but concerning the bulk of the matériel of a language—viz., conjunctions, prepositions, moods, tenses, &c.—which are purely mental concepts, meaning cannot be indicated either by sight or by "action." The meanings of these must therefore be suggested either from without or from within. If from without the suggestion must be in the nature of "thought-transference" or telepathy. That this may in part be the way in which very young infants comprehend the meanings of words I am not prepared to deny ; but I am of the opinion that it is not sufficient wholly to explain the phenomenon of the comprehension of spoken sounds. I have therefore put forward the hypothesis in my article that such suggestion comes from *within*, and that part of the "speech centre" of children is endowed with the capacity of comprehending the intended meanings of spoken sounds.

Some years ago a series of communications appeared in your columns [1] regarding "Calculating Boys." The analogy between the calculating faculty as found in these boys and the faculty for comprehending the meanings of spoken sounds, as found in infants and children, is very close, the calculating faculty being found also, as a rule, in childhood only and dis-

[1] THE LANCET, 1922, ii., 1099, 1154, 1205, 1259, and 1312 ; and 1923, i., 58.

appearing before adolescence. From the details of this calculating faculty as given in THE LANCET and by F. W. H. Myers,[2] it is obvious that the faculty must be a purely automatic function of a localised area of the brain. This being so, the hypothesis that one of the areas of brain concerned with the faculty of speech is endowed with the analogous capacity for comprehending the intended meanings of spoken sounds is not, I submit, either improbable or unreasonable.

I am, Sir, yours faithfully,

J. W. TOMB.

Asansol, Bengal, India, March 11th, 1926.

*** The controversy resolves itself into the question whether speech is to be regarded as an "instinct" or as a "capacity" or group of capacities. It is both. If instinct is, as it is generally defined, an impulse to act in certain ways in the presence of certain stimuli, then speech is entitled to rank as such, the provocative impulse being the speech of others—hence the echolalia of the young child and the dumbness of the deaf. Or, if we say this is only imitation, is not imitation an instinctive tendency? No one will deny, however, that more than instinct is involved, and that the full appreciation and command of language depends upon general intelligence and upon certain specific capacities. We are not convinced that a specific capacity to comprehend the meanings of spoken words is a sufficient explanation of the phenomena Dr. Tomb describes, if, indeed, it explains them at all. Dr. Tomb admits that the meaning of certain nouns and verbs is acquired by "means other than speech," but surely he does not seriously contend that the acquirement of the meaning of prepositions or conjunctions is explained by a mere capacity. They must be taught or suggested in some way. A capacity may explain language, but certainly not *a* language. Investigations into the vocabulary of young children have shown that the correct understanding and use of prepositions and conjunctions is a late acquisition, as compared with that of nouns and verbs; they are dependent upon a further development of intelligence. Dr. Tomb's suggestion that this capacity may be analogous to the calculating faculty of young prodigies is scarcely supported by the comparative rarity of the calculating faculty and its disappearance at adolescence. The difficulty felt by the adult is not that of comprehending meaning, but of retaining the new words. It is difficult to see how Dr. Tomb's theory explains the easy acquirement of several languages by young children in India in contrast to the relative difficulty felt by adults.—ED. L.

[2] Human Personality, Chapter III., pp. 51–55.

YORKSHIRE MINERS AND CANCER CAMPAIGN.—The Council of the Yorkshire Miners' Association decided by a large majority that a levy of 1*s.* per full member and 6*d.* per half member should be made in aid of the Cancer Research Fund. The levy will apply to all men and boys working in or about the mines, and it is estimated the total to be raised will be more than £5000.

DONATIONS AND BEQUESTS.—Miss Agnes Henderson, M.D., M.B.E., of Nagpur, Central Provinces, India, left £3500 to her brother for distribution amongst various hospitals and charitable institutions in accordance with instructions already given to him, and 5000 rupees to the Mure Memorial Hospital, Nagpur, the income to be applied towards the upkeep of a bed in that hospital.—Mr. Daniel Scotchford Elliott, Horsham, left £1000 each to the Horsham Hospital and the Sussex County Hospital.—Sir John Ritchie Findlay has given £10,000 to the Edinburgh Royal Infirmary managers to complete the purchase price of £90,000 for George Watson's College.—The executors of the late Mr. James Pickup, Hightown, Liverpool, have sent a cheque for £1000 to Blackburn Royal Infirmary for the endowment of a bed in memory of the donor's son, James Edward Pickup.—Mr. Milton Haydock, of Great Harwood, near Blackburn, besides bequests to public bodies, including a house and land, left £2000 each to Blackburn Royal Infirmary, Great Harwood and District Nursing Association, and Blackburn Crippled Children's Aid Society, and £500 to Wilpshire Orphanage.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

The Coroners Bill.

THE Coroners (Amendment) Bill, which was read a third time in the House of Lords on Monday, March 29th, was introduced in the House of Commons on Tuesday, March 30th, and read a first time.

The Protection of Animals Act, 1911 (Amendment) Bill.

On Tuesday, March 30th, Dr. DRUMMOND SHIELS introduced the Protection of Animals Act, 1911 (Amendment) Bill, which was read a first time.

Easter Adjournment.

The House of Commons adjourned for the Easter recess on Thursday, April 1st, until Tuesday, April 13th.

HOUSE OF COMMONS.

THURSDAY, MARCH 25TH.

Poor-law Infirmaries.

Mr. BROAD asked the Minister of Health if he would give a list of towns of upwards of 100,000 inhabitants showing the number of Poor-law infirmaries in each and giving figures showing the average number of patients, the number of medical staff, and the number of nursing staff.—Mr. NEVILLE CHAMBERLAIN replied: The following statement gives the information desired so far as it is available (omitting London):—

Towns or urban districts with over 100,000 inhabitants and union (U.) in which comprised.	Separate Poor-law infirm. in union.	Av. No. patients year ended 31/3/25.	Medical staff.	Nursing staff.
Birkenhead (U.) ..	1	466	4	90
Birmingham (U.) ..	2	1197	15	362
Bolton (U.)	1	489	3	86
Bristol (U.)	1	584	6	81
Croydon (U.) ..	1	425	3	88
Tottenham .. (Edmonton U.)	1	827	14	176
Leeds (U.)	1	980	5	153
Leicester (U.) ..	1	461	3	87
Manchester (U.) ..	1	478	3	140
Newcastle-on-Tyne (U.)	1	555	5	111
Nottingham (U.) ..	1	678	4	136
Portsmouth (U.) ..	1	860	3	99
Salford (U.)	1	806	5	156
Sheffield (U.) ..	1	537	6	107
Southampton (U.) ..	1	448	3	75
Stockport (U.) ..	1	310	2	64
Liverpool .. .. (West Derby U.)	2	1325	—*	—*
East Ham, Leyton, Walthamstow, West Ham (West Ham U.) ..	2	1337	10	242

* No information.

In the unions comprising the following towns or urban districts having over 100,000 inhabitants, there are no separate Poor-law infirmaries for the reception of the sick: Blackburn, Bradford (Yorks), Brighton, Burnley, Cardiff, Coventry, Derby, Gateshead, Huddersfield, Kingston-on-Hull, Middlesbrough, Norwich, Oldham, Plymouth, Preston, Rhondda, Saint Helens, Southend-on-Sea, South Shields, Stoke-on-Trent, Sunderland, Swansea, Willesden, and Wolverhampton.

Mr. BROAD asked the Minister of Health what number of beds were available for patients in Poor-law infirmaries in London and the provinces, respectively; and how many beds on the average were vacant during the periods of October to March and April to September, respectively.—Mr. NEVILLE CHAMBERLAIN replied: I regret that this information is not available in exactly the form suggested by the question. I hope that the statement below will give sufficient information for the hon. Member's purposes:—

Separate Infirmaries Provided by Boards of Guardians in London and the Provinces.

—	Separate Poor-law infirm.	Accommodation Jan. 1st, 1925.	Inmates Jan. 1st, 1925.	Av. No. inmates year ended March 31st, 1925.
London ..	27	16,530	13,999	13,844
Provinces	30	17,547	14,894	14,835

Service Men and Tuberculosis.

DR. VERNON DAVIES asked the Prime Minister whether he was aware that during each year a number of officers and men were invalided out of the Army, Navy, and Air Force suffering from pulmonary tuberculosis; that as a rule it was impossible accurately to determine whether the disease was attributable to the conditions of service or not; that the large majority of cases were decided as not being so attributable and consequently received no pension on account of their disability; and that the only money the men received during their prolonged and debilitating illness was from the National Health Insurance, which was inadequate for the purpose; and whether he would consider the possibility of instituting a form of insurance (compulsory or otherwise) for officers and men in these services against this disease, so that on being invalided out of the services for this disease they might receive a pension adequate for their needs until recovery or death.—MR. CHURCHILL (Chancellor of the Exchequer) replied: I am advised that the answer to the first and third parts of the question is in the affirmative. As regards the second part of the question, the disease is prevalent throughout all classes and all occupations, and unless there is evidence that the patient has been exposed to abnormal conditions of service to which he would not have been subjected in ordinary life, the disease cannot be held attributable to the service. Every case has therefore to be considered on its merits. As regards the fourth part of the question, the non-effective benefits granted to officers in non-attributable cases are considered sufficient, having regard to their ages and length of service. In attributable cases these grants are increased by supplementary allowances which in cases of total disablement amount to £100 a year. In addition grants in aid of sanatorium expenses are made so long as the officers remain on the active list. Men invalided for tuberculosis are entitled to the benefits of the National Health Insurance Acts, and, in addition, to a pension for life if they have 14 years' service (or 10 in certain cases). In attributable cases the pension based on service is supplemented by a further allowance in respect of the disablement. Where the service amounts to less than the above periods a gratuity is payable. As regards the last part of the question, I do not think it would be practicable to differentiate between tuberculosis and other non-attributable diseases, so far as insurance is concerned.

Vermin in the Hinckley Workhouse.

Sir CHARLES OMAN asked the Minister of Health whether he was aware that at a debate of the Hinckley Board of Guardians the statement was made by the master that the rooms inhabited by the tramps were verminous, and men's shirts, after they were washed, were in the same condition, and that he could do nothing more at present; that the board discussed the purchase of a calefactor and a disinfector and the prospect of obtaining a loan from the Ministry for such purchase; and whether he would grant the loan and spread over the time for repayment as long as possible, so as to encourage these and other guardians to take vigorous steps to prevent the spread of vermin.—MR. NEVILLE CHAMBERLAIN replied: Plans for the provision of improved casual accommodation in this union are at present under consideration, and sanction has been given to the raising of a loan for ten years for the purpose referred to in the second part of the question.

Milk and Dairies Draft Order.

MR. LAMB asked the Minister of Health whether his attention had been called to the serious delay which had taken place in connexion with the printing and circulation of the Draft Order proposed to be made under the Milk and Dairies (Consolidation) Act, 1915, and to the consequent difficulty of making its contents known to the great number of persons affected; and if he would extend the time during which representations might be made to him with regard to the provisions of the Draft Order.—MR. NEVILLE CHAMBERLAIN replied: I am aware of the delay referred to by my hon. friend and I shall, in view of it, be pleased to extend the time during which any representations may be made to me as to the Draft Order until the *end* of April.

Dispensers in the Army.

Sir PHILIP DAWSON asked the Secretary of State for War how many men in the British Army held the army qualification of dispenser; and how many of these army dispensers were actually employed at the present time in dispensing duties.—Sir L. WORTHINGTON-EVANS replied: The number of soldiers serving in the Royal Army Medical Corps who hold the army qualification of dispenser is 552, of whom 193 are employed on dispensing duties.

MONDAY, MARCH 29TH.

Deaths and Sickness among Coke Oven Workers.

MR. STEPHEN MITCHELL asked the Home Secretary the number of deaths and the number of cases of illness which occurred annually among those working at coke ovens and furnaces; the average length of time employees were able to stand this form of work; and if this employment was classed as a dangerous occupation.—Sir W. JOYNSON-HICKS replied: I regret that the information asked for in the first two parts of the question is not available. As regards the last part, employment at coke ovens has not been treated as an unhealthy occupation. No complaints of sickness among coke oven workers have been received, and it would appear from the mortality tables published in Part IV. of the Supplement to the Seventy-fifth Annual Report of the Registrar-General for England and Wales (pp. 2 and 31), that the mortality among coke burners in the three years 1910–1912 was considerably below the average for the population generally.

Medical Needs in East Africa.

MR. BENNETT asked the Secretary of State for the Colonies whether he was aware of the representations now being made by the British Social Hygiene Council for a percentage of the East African Development Loan to be allocated to urgent medical needs in those areas in which development works were to take place; and whether this purpose came within the scope of the East African Development Loan.—MR. AMERY replied: I am aware of the representations referred to. I must not anticipate either the advice of the Committee which I have appointed to consider the services to be met out of the loan or the decision of Parliament as to the provisions of the legislation which is required. It is, I think, generally recognised that provision should be included for capital expenditure on medical research, but I doubt whether it would be desirable to spend the loan money on recurrent services which are, or should, normally be met from annual revenue.

Indian Transferred Services.

MR. WALLHEAD asked the Under Secretary of State for India what subjects, services, duties, and responsibilities had been transferred by the Secretary of State for India from the India Office to the Office of the High Commissioner for India since the establishment of the latter office; and what consequential changes of staff had taken place.—Earl WINTERTON replied: The staff of the High Commissioner for India now deals (among others) with the following subjects, which have been transferred to his charge from that of the Secretary of State in Council: Indian students, leave-pay, pensions and passages of civil officers, recruiting in United Kingdom of all civil officers except those of the all India services, and a few special appointments, and opium and dangerous drugs. In all cases transfer of work has been accompanied by transfer of staff formerly employed upon it in the India Office, the total number so transferred since the formation of the High Commissioner's office being approximately 509.

Assistance for Blind Persons.

Captain FRASER asked the Minister of Health how many local authorities had made, or had under consideration for early application, schemes which gave blind persons in their areas an assurance of a minimum income equal to or greater than that provided under the scheme proposed to be inaugurated by the Hull Town Council under the Blind Persons Act, 1920.—Sir K. WOOD replied: Twenty-two authorities have made, and 12 authorities have under consideration, arrangements similar to those under consideration in Hull for the augmentation of the incomes of blind persons to a fixed amount, but my right hon. friend is not aware of any case in which it is proposed to give an assurance of a minimum income equal to or greater than that contemplated by the Hull Town Council.

Experiments in the Utilisation of Whey.

MR. AMMON asked the Minister of Agriculture the objects of the lactose factory erected by the State at Haslington in 1919–20; and the progress realised in the discovery of new processes.—Mr. GUINNESS replied: The object of the lactose factory was to discover an economic process for the utilisation of whey. In the opinion of those directly concerned with the experimental work this object has been achieved. The process is described in a monograph recently published by the Ministry.

TUESDAY, MARCH 30TH.

Miners' Industrial Diseases.

MR. CHARLES EDWARDS asked the Secretary for Mines whether he was aware that miners' nystagmus and other diseases to which miners were liable were not included in the Third Schedule of the Workmen's Compensation (Consolidated) Act, 1925; and as Section 44 did not preclude payment of compensation for any diseases not mentioned in the above Schedule to that Act, what steps he proposed to take to make clear the position of persons contracting these diseases after May next.—Sir WILLIAM JOYNSON-HICKS replied: The Act of 1925 was a purely consolidating

measure, and the reason why miners' nystagmus, beat-knee, beat-elbow, and beat-hand are not specified in the Third Schedule to the Act is that they are not specified in the corresponding Schedule to the Act of 1906. The right to compensation, however, in respect of these diseases remains unaffected. They were brought within the Act of 1906 by Orders made by the Secretary of State under Section 8 of that Act, and it is expressly provided in the 1925 Act that any Orders in force under a previous Act shall continue in force and have effect as if made under the 1925 Act. Subject, therefore, to the provisions of any future Orders, the new Act will apply to these diseases in precisely the same way as the present Acts. The position is quite clear, and I do not think it should be necessary for me to take any special steps in the matter.

Cost of Health Services.

Mr. HERBERT WILLIAMS asked the Minister of Health the total amount provided by the Exchequer for national health insurance and for all other health services in the financial year 1913–14 and in the Estimates for 1926–27.—Sir K. WOOD replied: The total amounts provided by the Exchequer for national health insurance and for all other health services administered by the Ministry of Health or its predecessors (excluding grants out of the assigned revenues and the cost of central administration) in the periods specified are as follows:—

	Expenditure, *1913–14.*	Estimates, *1926–27.*
	£	£
For National Health Insurance—		
Statutory proportion of benefits (other than sanatorium benefit) and cost of administration ..	1,760,555	5,427,000
Special grants towards cost of medical benefit and administration	1,529,500	Nil.
Statutory proportion of sanatorium benefit	160,000	
For other health services (including in 1926–27 grant in lieu of sanatorium benefit)	183,434	3,076,190
Total	£3,633,489	£8,503,190

London University and Bloomsbury Site.

Dr. LITTLE asked the Chancellor of the Exchequer what communication had been made to the Duke of Bedford with regard to the reversion to the vendor of the Bloomsbury site, which had been declined by the University of London because of the impossibility of fulfilling the conditions of Mr. Fisher's offer of 1920.—Mr. CHURCHILL replied: Notice has been served on the solicitor to the Bedford Estate offering the re-sale of the Bloomsbury site to the Duke of Bedford pursuant to the provisions of Clause 7 of the Conveyance of March 23rd, 1921.

WEDNESDAY, MARCH 31ST.

THE ECONOMY BILL.

State Contribution to Health Insurance.

The House went into Committee on the Economy (Miscellaneous Provisions) Bill, Mr. JAMES HOPE in the chair.

On Clause 1, which reduces the State contribution to the national health insurance scheme,

Mr. HARNEY moved that the clause be postponed. He said that there could be no doubt that this clause very intimately affected the approved societies. Not only did it alter the whole of the financial structure of the scheme, but it altered the benefits that they would be able to pay. This Bill could not possibly be completed before Easter and there was in his submission the strongest possible ground for this clause, which went to the root of the mischief as the approved societies saw it, not being dealt with until the societies had had an opportunity of considering it.

Mr. P. HARRIS seconded the amendment. He said this clause was the most controversial in the Bill. They were bound to criticise it word for word and line for line so long as the various friendly societies were not satisfied. Those societies were all meeting at Easter with this terrible cloud over them and they were bringing pressure on Members on all sides of the House to attack this clause. They were reasonable people, and it was possible that they might be placated. The Minister of Health might be able to make some concessions which would ensure the smooth passage of the clause. He thought, therefore, that the Minister would be wise if he agreed to postpone this clause to the end, so that he might have time to consult all the parties concerned and get the coöperation of the friendly societies instead of their hostility.

Mr. NEVILLE CHAMBERLAIN (Minister of Health) said that he was bound to resist the proposal. No valid reason had been advanced why the clause should be postponed. They were not dealing here with an ordinary amendment of the Insurance Act; they were dealing with an Economy Bill. It was well known that they could not fix the date for the opening of the Budget until they had disposed of this Bill. As regarded concessions, he had no reason to suppose that if on this Bill suggestions were put forward which did not affect vital matters that he would not be able to make concessions.

Mr. LLOYD GEORGE said there was no doubt at all that this was a question which the societies ought to have time to consider. The House of Commons was now adjudicating on a proposition which was never before the country at the last General Election. It was a new change—a change which even the Chancellor of the Exchequer did not anticipate last year.

Replying to further discussion,

Sir KINGSLEY WOOD (Parliamentary Secretary to the Ministry of Health) said that this clause had been before the approved societies for three weeks. They had been given as much information in regard to it as had been given in connexion with any proposal that had been before the House for some time. There was an actuarial report, and there was an exposition of the clauses of the Bill. Explanations were fully given. Immediately the present Bill was introduced the Minister of Health called together the Consultative Council representing all the approved societies in the country. That meeting was held, he believed, on the very day when the text of the Bill was available to members of the House. His right hon. friend made a statement to that gathering and explained at considerable length the provisions of the Bill. After having considered the proposals at length, carefully and seriously, the Consultative Council came to the conclusion that while they had no objection to Clause 2 they were opposed by a majority of 28 to 6 to the proposals of Clause 1. There was no proper reason, however, why Clause 1 should be postponed. If at the conferences up and down the country at Easter any practical suggestions were put before his right hon. friend, he would be glad to consider them and they could be dealt with at other stages of the Bill.

After further discussion Mr. J. H. THOMAS moved that the Committee "Report Progress." This was defeated by 227 votes to 124, and the discussion on Mr. Harney's amendment was resumed.

Some time later, Mr. CHAMBERLAIN moved the closure which was carried by 232 votes to 127. The motion to postpone the clause was then negatived by 229 votes to 129.

The Question of a Broken Pledge.

The Committee then proceeded to a long discussion on the general principle of Clause 1 on an amendment moved by Mr. J. H. THOMAS, the object of which was to prevent the clause being operative until the next General Election. The right hon. gentleman gave numerous quotations from speeches delivered during the passage of the original Insurance Act in 1911 to support his contention that pledges were given to the approved societies with regard to the amount of a State contribution, which were being broken in the present Bill. He said he wished to contrast the treatment that the approved societies had received from the Government with that which the societies had meted out to the Government. References had been made in the debate to the difficulties experienced owing to the threatened trouble with the doctors. Immediately the facts were put to the approved societies they took the responsibility of saying: "The State is in a difficulty; we will help them out with their burden." At the same time the societies were promised a Royal Commission, and now having helped the State, having provided the money and taken over a liability which they need not have taken over, and which if they had forced the hand of the State Parliament would have had to take over—although the societies had acted in this way at the time of the ultimatum issued by the doctors—this was the way that they were being repaid! He asked the Committee to ponder before they took this step which the Government asked them to take. What was the amount of money to be saved? Just under £3,000,000. The great Economy Bill provided £10,000,000 all told, every copper of which came from the sick, the maimed, and the children, and, worst of all, from the unemployed. Although he fully anticipated the fate of his amendment, he knew the ultimate verdict and judgment would be determined not inside but outside the House.

Mr. LLOYD GEORGE said he had great pleasure in supporting the amendment moved in a very powerful and convincing speech by Mr. Thomas. The Minister really responsible for this outrage was not present to defend it. The real artful dodger was not there, and it had been left to the Minister of Health to defend something which he thought in his heart he must feel to be rather indefensible. He was told that it was a question of economy. If the country were really hardly pressed and it was a question of £2,000,000 or £3,000,000 to extricate it from its difficulties, no one believed that the 15,000,000 workmen in the insurance societies would decline to consider it. But now when the national burdens had decreased—they were down by

£200,000,000 or £300,000,000 since 1920—and when the benefits under this scheme had matured, for the Government to say that they would take away this £2,800,000 was not a very reputable thing to do. The Government might have consulted the societies, but they had not done so. Was it worth while in order to save ½d. in the £ on the income tax to deprive workmen of the benefits to which they were looking forward for the last 10 or 15 years, and especially at a time when there was so much industrial trouble brewing? Would it not cost the Exchequer a great deal more in the end? If the Government had suspended the building of even one cruiser they would have been more than able to supply the money required over the next three years, and in that period the country would be recovering. When prosperity returned and the revenue returns went up, the Chancellor of the Exchequer would be able to meet the liability, and probably to decrease the taxation very considerably.

The Minister of Health's Reply.

Mr. CHAMBERLAIN said that they had been again reminded that this was a question of a bargain and of a breach of faith. He had not been able to understand what was exactly the bargain which Mr. Thomas and Mr. Lloyd George said that the Government had broken. Under the original scheme the contribution was 7*d.* and the benefit 7*d.* Under the Act of 1920 the contribution was raised to 10*d.*, but the benefits were also raised to 10·7*d.* As a result of the Pensions Act the contribution was reduced to 9*d.*, but the benefits were reduced only to 10½*d.* Therefore, if they made no alteration in the State contributions people would actually be receiving benefits worth 1½*d.* more than the contributions. Until they had a report of the Actuarial Committee and the report of the Royal Commission it was impossible to say what reconstruction was possible and feasible. But it was quite a mistake to suppose that this reconsideration and review of the whole scheme for national health insurance arose solely out of the need of economy. It would have had to be reviewed in any case. The original scheme was merely experimental. The scheme had been amended in all sorts of ways, but this was the first time that there had been a full review of the whole scheme as they found in the report of the Royal Commission. In any case they were bound to review the financial basis of the scheme and make some alteration in it. The investigation showed that there was a margin in the contributions over and above what was required to provide the benefits under the existing category. The margin was greater than was necessary even to provide the additional benefits distributed already. The Royal Commission while disclaiming any duty to say whether or not that margin should be taken by the State—a question on which they were not competent to speak—showed there was a margin, and on the assumption that it was not to be taken by the State they made certain recommendations. The first of those recommendations was that the full cost of medical benefit should fall on the funds of the approved societies. That was, of course, embodied in the present Bill. There would remain a further sum which the Royal Commission recommended should be used in a certain way for additional insurance benefit. That was the sum which under this Bill the Government were taking because of the needs of the country. The needs of the country were not going to be satisfied by £2,800,000 a year, but in taking a general view of the financial needs of the nation and looking round to every department and every source to see what could possibly be saved and what reductions in expenditure could be made they would not have done their duty if they had neglected to consider the report of the Royal Commission and the opportunity afforded them to take some of the margin. He took any charge of a breach of faith as a serious matter, and, he made no distinction between pledges made by himself and those given by other Ministers who had preceded him; and if he thought that in these proposals any charge could fairly and properly be brought against them of breaking their pledges certainly he would be no party to them. He did not deny that pledges were made in 1911, but he contended that they were keeping those pledges. The Government were not raiding surpluses; the surpluses were entirely untouched by the Bill. After this Bill was passed the societies would still continue to reap the benefit of their thrift and their careful and economical management; but the report of the actuary and the report of the Royal Commission showed without any shadow or vestige of doubt that the surpluses which had been accumulated to such a gigantic figure had been due in the main to extraneous causes which were not to be described as due to anything that had been done by the societies, but arose mainly out of the extra rate of interest which they were enabled to earn. The rate was 3 per cent., which was taken into account by the actuaries when they were making their calculations as to the appropriate rate of contribution by the State in the original scheme. Now that the rate of interest was 5 per cent. instead of 3 per cent. it was reasonable that they should review the whole situation. He denied the statement that the Government had not treated the societies fairly. Various Governments had taken upon themselves the burden of the extra cost of diseases estimated at £19,000,000 and on account of minor charges another £5,000,000. He might also mention other things such as provisions for the improvement of the public health, &c., provisions for the relief of tuberculosis, sanatoria, maternity and child welfare schemes, and so forth. All those meant that to the extent they had been successful they had relieved the approved societies. The Government said to the societies: "You really do not require this extra money so much that we are justified in asking the taxpayer to find it for you." The societies had been able to distribute benefits among their members at a far higher level than they ever had any reason to expect, and when the whole country was suffering from a heavy burden of taxation it was not reasonable that they should go on accumulating surpluses at this rate. The actuary had given it as his considered opinion that the proposals of the Government would not touch any of the benefits which the societies had contracted to pay to their members. He thought that hon. Members opposite were too pessimistic about the future of the approved societies. They had seen a steady rise in the rate of accumulation of surpluses in the past. In the first period of six years they were £17,000,000; in the second period, which was only four years, there were accumulated surpluses including the carry forward and the contingency fund amounting to £45,000,000, and in the remaining period of only about two years it was already estimated that there were accumulated surpluses amounting to £20,000,000 additional. Under the Pensions Act the societies were relieved of the liability of cash benefit to people between 65 and 70, and that applied to additional benefits just as much as to normal benefits. The second point was that the average of contributions per year was steadily going up. At one time the average contribution was 43, but it was now 47. He dare say it would go higher still if unemployment continued to decrease. These were figures which gave them a certain amount of confidence in the future, and he was very strongly of the opinion that in spite of the diminution in the State contribution proposed in this Bill when the third valuation came round the surpluses would be sufficient to enable the approved societies to continue all the benefits which they had been able to declare under the second valuation.

Danger of Restricting Benefits.

Dr. DRUMMOND SHIELS said that the more he considered this measure the worse it seemed to get. He had hoped that, as had been indicated by the right hon. gentleman on more than one occasion, the present benefits and the additional benefits which either had already been given or had been sanctioned under the second valuation would have been safe until 1931, but he thought it was very obvious on reconsideration of all the facts that even the extended benefits were in very great danger. He had been impressed with the ability displayed by the officials of the approved societies in the carrying out of their work, and he thought that their opinions were entitled to very serious consideration. There was no doubt they believed that not only would the further extension of medical benefit be prevented by this Bill, but where they paid the present extended benefit and gave extended medical treatment it would be impossible for them in many cases to carry on till 1931. The approved societies were faced with an immediate reduction of income starting from the time this Bill became law. There had not been very much said about the fact that the increased charge for medical benefit, which did not mean increased payment for the doctors, but was simply a transfer of the liability for the last increase from funds which the approved societies permitted to be raided two years ago, would undoubtedly involve an increased expenditure by approved societies. Therefore, as between the reduction of the State contribution and the increased cost of medical benefit it seemed to be quite inevitable that the splendid additional benefits which had been given by many societies would have either to be modified or withdrawn altogether, and certainly societies which did not give them now would not be able to give them in the future. Was this really economy? Take the matter of the dental benefit which had been given by a number of approved societies, but not by others. There could be no question about the tremendous value to public health of a dental service. Even from the point of view of economy it would be very desirable that a full dental service should be given by every approved society. It not only prevented many branches of disease, but it gave also a very greatly increased comfort and happiness to the individual. There was no question that this Bill when it became an Act would prevent the extension of this medical benefit in the shape in which it was already given, and in other cases it would prevent it

being brought into operation. The same applied to optical benefit, which was of very great importance for those who required that form of treatment. Again, take the question of maternity benefit. Various societies had been able to increase that benefit. At the present time it only amounted to about £2, and all that money went either to the doctor or to the midwife and the person most concerned was left with the baby to hold. He thought it would be agreed that double the existing benefit, amounting to £4, which in some societies had been raised to £5 with the contributions of the husband and wife, if they were both insured, was about the least that was useful or desirable for maternity benefit. It was extremely important that they should get to the stage of giving that benefit at as early a time as possible. But that again was going to be prevented by this Bill. The Pensions Act was supposed to relieve approved societies of a liability of £37,000,000. He had not heard it stated that as against that provision had been made for a reduction of reserve value and prospective income of societies to an extent roughly equivalent to the amount of that relief. The circumstances which brought about the higher rate of interest had also increased in similar proportion the expenses of administration. One of the gravest charges against the Government in connexion with this matter was that they had gone against the recommendations of the Royal Commission, which contained among its members the Government Actuary, and which actually said that the payment by the Exchequer of its present proportionate share of the cost of benefits and their administration should be continued. The proposals of this Bill were not an economy at all, but a grave set-back to social progress. It was bad enough to diminish the prospect of continued extra benefit, such as the dental, optical, and other benefits, but one of the worst things was the fact that the Bill postponed indefinitely the provision of specialist medical treatment. Practically all the witnesses before the Royal Commission put those benefits first, and the Royal Commission put them first whenever funds were available. He did not think that hon. Members realised the tremendous importance which approved society officials and insured persons themselves attached to these services. At the present time if a well-to-do person was ill, and his doctor was in attendance on him, the doctor might come to the conclusion that a surgical operation was possibly required. He might have some doubt as to the diagnosis, and he would then suggest to the relatives that he would like a second opinion. The relatives said, "Certainly." Then the doctor could go to the telephone and call up a specialist, who came in an hour or two and the patient got the full benefit of the specialist service. In the case of an insured person the man's doctor might be in the same difficulty. If he put the same question to the relatives they would say that they could not afford a specialist's fee. Then the doctor would have to say: "We will have to try the hospital." But, as he had pointed out in the debate in the second reading of this Bill, so far as Scotland was concerned —and he thought that the same applied to England—there was a waiting-list in the six main Scottish hospitals of 5800 people waiting for beds. The Committee which had just been considering the question of the Scottish hospitals had reported that many of these people suffered as a result of their waiting, and some even died, as a result of hanging on waiting for a bed. He felt that the insurance medical service would never be anything but partial and very unsatisfactory until it included the fullest possible benefits which modern medical science could give. A new arrangement with the doctors was imminent, and would take place at the end of this year, but supposing that a composite arrangement might be made would it include a specialist service? The additional medical charge in view of the financial circumstances of the approved societies would make the position of the societies impossible. He was afraid, therefore, that the specialist inclusive service they might have had normally next year must be put off now until some unknown time. Many approved societies had realised the importance of these specialist services and had made arrangements with hospitals, nursing associations, dispensaries, and other organisations, in order that a certain amount of specialist service and institutional treatment might be secured for their members. That would probably be cut off at once, because it was paid for not out of the surplus but out of the ordinary benefit fund. So it seemed to him that the hospital problem, which was deplorably bad in Scotland and also in England, would be made worse as a result of the cutting off of these contributions. If there was any money to spare in connexion with this fund there were innumerable ways in which it could be spent, not only for the advantage of the insured people, but also to make the fund what it was proposed to be at first—a full and complete medical service for the very humblest insurance contributors.

The closure having been carried, Mr. Thomas's amendment was negatived by 209 votes to 118.

Mr. BLUNDELL moved an amendment providing that the Government should continue to pay their two-ninths contribution towards the cost of the statutory benefits, and that the societies should bear the cost of the other benefits which they were able to provide. That would mean that the Government would save a considerable sum of money without upsetting the finances of the approved societies. They would save, according to the actuaries' report, £1,200,000 in 1926-27, £1,500,000 in the following year, and thereafter an average of £1,200,000.

Mr. CHAMBERLAIN said the amendment was a very startling one. It meant that from the financial point of view he was going to lose, if he accepted the amendment, £1,500,000 in the first year out of the £2,800,000 and £1,000,000 a year after that. He was not closing his mind to any modification in the Bill which did not go to the root of its vital principles. But to cut the saving in half was obviously more than he could be expected to accept. If the hon. gentleman could suggest some way of covering the proposal which would go some way towards meeting his fears, and at the same time would not cut away the savings until they were no longer perceptible, he should be glad to discuss matters with him.

Mr. BLUNDELL expressed his willingness to withdraw the amendment, but the Opposition objected. The closure was carried by 200 votes to 114, and the amendment was then rejected without a division.

Progress was reported.

Medical News.

UNIVERSITY OF LONDON.—Amongst the recipients of degrees on March 24th were Margaret M. A. Murray (M.Sc., physiology), Egon Sharpe Pearson (D.Sc., statistics), and Ethel May Newbold and Leonard H. C. Tippett (M.Sc., statistics).

The following have satisfied the examiners in Part I. of the Third Examination in Dental Surgery: Cyril Hall, Frank S. Krusin, and Cyril G. Walmsley, all of Guy's Hospital.

ROYAL COLLEGES OF PHYSICIANS OF LONDON AND SURGEONS OF ENGLAND.—At recent examinations for the Diploma in Tropical Medicine and Hygiene the following candidates were successful:—

Ahmed Khalil Abdel-Khalik and Mahmoud Abdel-Hamid Atiya, Cairo; Basil N. V. Bailey, Edinburgh; Hargobind Lal Batra, Punjab and Edinburgh; Hugh B. Boucher, St. Thomas's; Gwendolen S. M. Chataway, Royal Free and St. Mary's; Ernest E. Claxton, St. Bart.'s; Abdel-Kader Hilmi El Shurbagi, Cairo; Silvio C. Gomes, Edinburgh; Geoffrey D. Gordon, Cambridge and St. Thomas's; Frank G. Greenwood, St. Bart.'s; John R. Hayman, Middlesex and Royal Army Medical College; Margaret Holliday, Dublin; Laura M. Jacobs, Royal Free and St. Mary's; John J. Keevil, Cambridge and St. Thomas's; Harold D. B. Miller, Melbourne; Richard M. Morris, Cape and London; Edward A. Penny, Guy's; John C. Pyper, Glasgow; Reginald D. Reid, St. Bart.'s; Ernest A. Struthers, St. Andrews; Arthur G. Taylor, Birmingham; Leo G. W. Urich, Middlesex; William J. Webster, Aberdeen; Isabel J. Woodhouse, Royal Free; Li Tsoo Yiu, Hong-Kong; and William A. Young, Oxford and St. Thomas's. (All the above, with one exception, were students at the London School of Hygiene and Tropical Medicine.)

UNIVERSITY OF DUBLIN, SCHOOL OF PHYSIC, TRINITY COLLEGE.—At examinations held recently the following candidates were successful:—

FINAL MEDICAL EXAMINATION.

Part I., Materia Medica and Therapeutics; Medical Jurisprudence and Hygiene; Pathology and Bacteriology.—•Robert R. Woods, •Maurice F. N. Griffin, •Thomas C. M. Corbet, Maximilian Gerber, Edward G. Montgomery, Isidore Isaacson, Samuel R. Elmes, Ralph W. T. H. Stewart, Hyman Dundon, Henry A. Ferguson, John M. M'Elligott, Louis R. Brumberg, Isaac F. Ratthaus, Wilhelm F. Knobel, John K. Harper, and Cecil F. Cope.

Part II., Medicine.—•Henry O. Clarke, •Arthur J. Conlin, Ernest H. Hall, Philip F. Palmer, George A. Walmsley, Thomas J. W. Keown, William C. G. Potts, Jack M. Selkon, Edward W. Bingham, Maiben A. W. Roberts, Nancie N. Lowther, Andrew E. A. O'Byrne, Isabella K. M'Neilly, Elias Rakoff, Kathleen I. Purdy, Thomas F. M. Woods, Samuel Smyth, George W. H. Townsend, Richard T. P. Tweedy, Gerald V. A. Griffith, George G. M'Farland, Donald B. O'Sullivan-Beare, Edward H. Harte, Evelyn E. Connolly, Caleb P. Wallace, James Craig, James G. M'Dowell, Robert H. Mitchell, Ernest E. Malone, and Daniel J. Roux.

Surgery.—•Seymour F. Heatley, Ransome M. Allardyce, George W. H. Townsend, Charles R. Boland, George A. Miller, Henry J. Roche, David N. Power, John H. M'Lean, Margaret W. Pike, Mary S. Miller, Richard G. Keays, Johan N. S. Gouws, Joseph V. Pincus, William Russell,

Herbert Nelson, Gerald A. A. Powell, Lucy E. R. Pigott, Mabel E. Brittain, Cicero G. Nel, Gilbert T. L. Archer, Arthur B. Brooks, Wolsey C. Sloan, James F. MacMahon, William G. Maule, Albert Sachs, Charles L. Taylor, and William Magowan.

Midwifery.—*Ernest E. Malone, Ernest E. Satchwell, Samuel Smyth, Derek St. C. Mackenzie, Henry A. Ferguson, John Quigley, John B. Patrick, Charles F. M. Wilson, Martinus G. J. Booysen, Norah E. Fenton, John Johnston, Norman J. U. Mather, and William P. Culbertson.

* Passed on high marks.

INTERMEDIATE DENTAL EXAMINATION.

Anatomy and Physiology.—Francis J. P. M'Carthy.

FINAL DENTAL EXAMINATION.

Dental Surgery and Pathology; Dental Mechanics and Metallurgy; Orthodontics.—Eric N. Guise-Brown.

DIPLOMA IN GYNÆCOLOGY AND OBSTETRICS.

Isaac Valvi Yoffa.

AUXILIARY ROYAL ARMY MEDICAL CORPS.—The annual meeting of the members of the Auxiliary Royal Army Medical Corps Funds will be held at 2.30 P.M. on Friday, April 23rd, at 11, Chandos-street, Cavendish-square, London, W., when the annual report and financial statement for 1925 will be presented, and the officers and committee for the current year will be elected.

JOINT TUBERCULOSIS COUNCIL: POST-GRADUATE COURSES ON TUBERCULOSIS.—As already announced (THE LANCET, Feb. 20th, p. 403), Prof. S. Lyle Cummins will hold an intensive course at Cardiff from April 12th to 17th for medical men and women specially engaged in tuberculosis work. There will also be a similar course in London from April 19th to 24th. Inquiries should be addressed to the hon. secretary at 19, Brunswick-square, London, S.E. 5.

HUNTERIAN SOCIETY.—The Council of this Society has presented a satisfactory report for the session 1925–26, so that it has been possible to consider the question of resuming the publication of the Proceedings in volume form. As, however, this means the institution of a guarantee fund, the Council will invite expressions of opinion from the constituency. The report also places before the Fellows the advisability of appointing a librarian, in view of the fact that an important collection of books belonging to the Society has been for many years in private keeping. Mr. A. E. Mortimer Woolf has been nominated as President on the retirement of Dr. Howard Humphris.—A dinner meeting of the Society will be held at Simpson's Restaurant, Cheapside, London, on Monday, April 12th, at 7.30 P.M. At 8.30 P.M. the annual general meeting will begin, after which Lord Hewart (the Lord Chief Justice) will read a paper on Criminal Law and its Relation to Insanity.

POST-GRADUATE VACATION COURSE AT DAVOS.—A course dealing generally with tuberculosis and alpine climate (the third of its kind) will be held in Davos from August 22nd to 27th. The programme will include lectures and demonstrations by the medical men of Davos, on the climatology, pathology, diagnosis, and prognosis of tuberculosis. The lectures are given chiefly in French and German, but arrangements are being made this year for certain lectures and demonstrations to be given in English. It is hoped that many English medical men will avail themselves of this opportunity of seeing the great tuberculosis centre of Davos. In former years the course has been largely attended by continental medical men and students, but so far the English attendance has been very meagre. Dr. Bernard Hudson, of the Victoria Sanatorium, Davos-Platz, Grisons, Switzerland, would be glad to supply any further information or assistance, and full particulars will be published later. There will be special terms for railway travel and hotel accommodation.

THE LATE DR. G. W. MALIM.—Dr. George Warcup Malim, who died on March 31st at the age of 80, came of a Lincolnshire family which for generations had given a son to the church, law, and medicine. Educated at Grantham Grammar School, he received his medical training at Birmingham and Guy's Hospital, qualifying as M.R.C.S. and L.S.A. in 1865. After some experience in Bilston in Staffordshire and elsewhere, he went to Rochdale 55 years ago, and there built up a large practice from which he retired only two and a half years ago. Dr. Malim was an out-and-out opponent of the Health Insurance Acts, and resolutely refused to join the panel. He was appointed a justice of the peace for the borough of Rochdale in 1885, and at the time of his retirement was the oldest resident magistrate as well as the oldest medical practitioner in the town. A man of warm and generous sympathies, he won the confidence and affection of his patients, and when he retired was followed by the gratitude and good wishes of his many friends. Of the family of 12, of which Dr. Malim was a member, six are still living. His wife died many years ago; he leaves three daughters.

Sir Kingsley Wood, Parliamentary Secretary, Ministry of Health, has appointed Capt. D. W. Gunston, *M.C.*, M.P., to be his Parliamentary Private Secretary (unpaid).

THE Home Secretary has appointed Lieut.-Colonel John Allan Anderson (formerly of the Royal Army Medical College) to be an Inspector under the Cruelty to Animals Act, 1876.

THE death is announced from Melbourne, Australia, at the age of 71, of Sir Harry Brookes Allen, Dean of the Faculty of Medicine and for many years professor of pathology in the University of Melbourne.

WEST KENT MEDICO-CHIRURGICAL SOCIETY.—A meeting of this society will be held at the Miller General Hospital, Greenwich, to-day, Friday, April 9th, at 8.15 P.M., when Dr. E. P. Cumberbatch will read a paper on the Treatment of Gonococcal Infections by Diathermy.

SOCIETY FOR CONSTRUCTIVE BIRTH CONTROL.—Colonel R. J. Blackham, M.D., will take the chair at a debate on Birth Control to be held at the Essex Hall, Essex-street, Strand, London, on April 22nd, at 8.15 P.M. Lord Morris will represent the Roman Catholic point of view and Dr. Marie Stopes will speak for the society.

NO. 55 GENERAL HOSPITAL B.E.F.—A reunion dinner will be held at the Trocadero Restaurant, Shaftesbury-avenue, on Saturday, May 15th, at 7 for 7.15 P.M. Old officers intending to be present are asked to communicate at once with Dr. H. B. Roderick, 17, Trumpington-street, Cambridge.

MEDICO-LEGAL SOCIETY.—At an ordinary meeting of this society to be held on Tuesday, April 20th, at 11, Chandos-street, Cavendish square, London, W., at 8.30 P.M., Mr. C. Ainsworth Mitchell will read a paper on Some Aspects of the New Regulations on Preservatives. At the discussion following members of the Society may introduce guests.

LONDON FEVER HOSPITAL.—The 104th annual report shows that the fever patients treated were fewer by 103 than in 1924, in consequence of a fall in the number of cases of measles. But while there were only 39 patients suffering from measles, as against 249 in the preceding year, 196 cases of rubella were admitted—almost as many as the total of the previous four years. There were no deaths from measles or enteric (of which there were only six cases); there was one death from scarlet fever and one from diphtheria. Among the nursing and domestic staff there were 13 cases of diphtheria, three of scarlet fever, and one of rubella.

"CRITICAL CONDITION" OF THE LIVERPOOL HOSPITALS.—Mr. H. Wade Deacon, the chairman, at the annual meeting of the committee of the Liverpool Royal Infirmary, declared that as regards the large general hospitals in the city the voluntary system is in a critical condition. The four large hospitals are getting ever more deeply into debt, but they have agreed not to issue any appeals until the Lord Mayor's Committee has matured its plans for the establishment of a contributory scheme. Mr. Wade Deacon, who has been chairman of the Royal Infirmary since 1912, and has also been chairman of the British Hospitals Association, was last week publicly presented with his portrait by the Lord Mayor of Liverpool in recognition of his services.

THE LATE DR. J. BROWNLEE MILNE.—Dr. John Brownlee Milne, of Penmachno, Bettws-y-Coed, died suddenly at Llandudno railway station on March 16th; he had suffered from heart trouble for many years. Dr. Milne was 46 years of age and a native of Montrose. He graduated M.B. and Ch.B. at the University of Edinburgh in 1900 and then was house surgeon in the Bradford Children's Hospital and in the Stanley Hospital, Liverpool. He practised for a time in Hull and also in the London district; after the war he went back to Liverpool as a ship's surgeon. He served in the war as a captain in the R.A.M.C. and was badly wounded at Arras. At the time of his death he held the appointment of medical officer for Penmachno and public vaccinator for Llanrwst and district.

THE OPTICAL CONVENTION.—Mr. Stanley Baldwin, the Prime Minister, will open the Convention (of which an account appeared in THE LANCET, Feb. 27th, p. 452) on Monday, April 12th, at noon, at the Imperial College of Science, South Kensington. The Convention will last until April 17th and meets under the presidency of Sir Frank Dyson, the Astronomer Royal. It is intended that every branch of science and industry which is interested in optics shall be represented, and the papers and exhibition cover a correspondingly wide range of subjects. For the less erudite there will be popular lectures and an entertainment section which bids fair to be very entertaining indeed. The offices of the Convention are at 1, Lowther-gardens, Exhibition-road, London, S.W.

Sir James Barr has been elected President of the Royal Infirmary, Liverpool.

NOTTINGHAM HOSPITAL SATURDAY FUND.—Last year the collections for this fund reached £28,708, the largest total yet obtained. This sum supplies more than half the financial needs of the Nottingham General Hospital.

PRESENTATION TO A MEDICAL MAN.—Mr. J. Ernest Nevins, M.B. Lond., M.R.C.S. Eng., has been presented by the staff at Brownlow-hill Infirmary, Liverpool, with a Chippendale cabinet with some other gifts, on his retirement from the post of visiting physician to the infirmary after 26 years' service.

THE LATE DR. R. B. ALSTON.—In the course of an examination at St. Thomas's Hospital on March 18th for a medal in pathology Dr. Ronald Bruce Alston pricked his finger whilst making a post-mortem examination and died from septicæmia ten days later. A day or two after the accident he had complained of pain and swelling in the finger, but said that he did not remember having injured it. Dr. Alston was a student at St. Thomas's Hospital, and qualified M.R.C.S., L.R.C.P. in October, 1925.

"RECORDS" AT COVENTRY.—The annual report of the Coventry and Warwickshire Hospital shows not only a record income—over £40,000—but that the number of patients was greater than ever before. The pressure upon the X ray, electrical, and massage departments was so great that it was found necessary to increase the staff and instal more apparatus. It is hoped that by the end of the present year the money needed for extensions will be forthcoming. The report says that a second operating theatre is an imperative necessity. The hospital, which contains 241 beds, a number that is now totally inadequate, has been five times enlarged in less than 20 years.

ST. ANDREW'S HOSPITAL, DOLLIS HILL.—The annual report of this Roman Catholic foundation of 52 beds states that whereas in 1913, the year in which it was opened, 540 patients were received, in 1925 the number reached 900. By affiliation with the Royal Free Hospital it is now recognised as a training school for nurses, more accommodation for whom is urgently needed. The hospital is intended for patients who, while not suitable subjects for free reception in charitable institutions, are yet unable to meet the cost of adequate medical or surgical treatment in private nursing homes. Patients are admitted only on the recommendation of their own medical adviser, and in a certain number of beds preference is given to patients of French-speaking countries.

DR. JESSIE MACGREGOR PRIZE.—This prize of 60 guineas will be awarded in July next to the woman graduate or qualified woman student of the University of Edinburgh who presents the best record of original work in the science of medicine. Such work may be published or unpublished, but must not have been published earlier than July, 1923. The successful applicant shall, within six months following the award, deliver a lecture to the medical profession in Edinburgh on the subject of the work for which the prize has been awarded. Applications marked "Dr. Jessie Macgregor Prize in Medical Science" must reach the Convener of Trustees, Royal College of Physicians of Edinburgh, not later than June 30th.

THE LATE DR. J. B. YELF.—Dr. John Burnet Yelf, who died at Hemel Hempstead on Feb. 28th, was born in 1871 and was the son of the late Dr. L. K. Yelf, of Moreton-in-the-Marsh. He was educated at Epsom and went on to St. Mary's Hospital, qualifying M.R.C.S. and L.R.C.P. at the age of 22. After house appointments there Dr. Yelf settled at Shipston-on-Stour in Worcestershire, where he remained in practice until last year, when failing health enforced his retirement. He served in the Royal Army Medical Corps during the war. He took a great interest in sport and in local affairs generally, and was also a keen Freemason; his death will be deeply regretted in the district. In 1894 Dr. Yelf married the daughter of Mr. John Barnard, of Gloucester, by whom he had one son and two daughters.

WELFARE OF EDINBURGH CHILDREN.—The report of the Edinburgh public health department for the past month contains a comparison of the condition of children under 5 years of age in 1913–14 and 1923–24. Dirty clothing is less common in the later period; a verminous state of the head is more frequent among boys but less frequent among girls—presumably because of shorter hair; really bad nutrition is distinctly rare; the condition of the teeth appears to be worse. Heights and weights show little change. Enlargement of lymphatic glands seems less common (perhaps, it is suggested, because the milk-supply has improved); the percentage of children described as having squint has increased; and the number of vaccinated children is smaller.

MATERNITY WORK AT BRISTOL.—At the annual meeting of Bristol Royal Infirmary it was stated that in consequence of the city's unsatisfactory housing accommodation one out of every six children born in Bristol is dealt with by the hospital, within or without its walls. The ordinary expenditure last year exceeded the ordinary income by £8000.

THE LATE MR C. E. PRONGER.—Mr. Charles Ernest Pronger, who died on April 2nd at his home in Harrogate, studied medicine at St. Thomas's Hospital, becoming L.R.C.P. Lond. in 1876 and F.R.C.S. Eng. in 1891. He was assistant demonstrator of anatomy at St. Thomas's Hospital. For a time he was in general practice in Barnstaple and was attached as surgeon to the Barnstaple and North Devon Infirmary, later becoming consulting surgeon to that institution. He settled in Harrogate in 1892 as an ophthalmic surgeon and soon developed a wide consulting practice. For many years he was attached to the Harrogate Infirmary, where he started the eye department, raising the money for its establishment, and he was also ophthalmic surgeon to the Yorkshire Home for Incurables and to the Northern Police Orphanage. He made a special study of refractive errors and was one of the first to emphasise the importance of correcting the minor degrees, pointing out that the grosser errors do not cause so much upset to the individual as the lesser ones which produce a constant strain. Mr. Pronger did all he could to promulgate this view by monographs and contributions to medical journals and could show excellent results in his own practice. He was an enthusiast in his special work and followed up his cases afterwards. For recreation he was a keen golfer and was at one time captain of the Harrogate Golf Club. He leaves a widow, but no family.

Medical Diary.

Information to be included in this column should reach us in proper form on Tuesday, and cannot appear if it reaches us later than the first post on Wednesday morning.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MONDAY, April 12th.—4.30 P.M., WAR. Annual General Meeting: Election of Officers and Council. Major H. S. Blackmore, R.A.M.C.: The Pathology of Mustard Gas Burns and its Relation to Problems of Prevention and Treatment.

TUESDAY.—5 P.M., THERAPEUTICS AND PHARMACOLOGY. Annual General Meeting: Election of Officers and Council. 8.30 P.M., PSYCHIATRY. Dr. G. W. B. James: Cerebral Arterio-sclerosis.

THURSDAY.—8.30 P.M., NEUROLOGY. Dr. D. McAlpine: The Pathology of the Parkinsonian Syndrome in Epidemic Encephalitis.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

ANCOATS HOSPITAL POST-GRADUATE LECTURES, Quay-street.

THURSDAY, April 15th.—4.15 P.M., Dr. Langley: Diabetes in General Practice.

MANCHESTER AND SALFORD HOSPITAL FOR SKIN DISEASES POST-GRADUATE COURSE.

THURSDAY, April 15th.—4.30 P.M., Dr. Savatard: Tumours of the Skin.

MANCHESTER ROYAL INFIRMARY POST-GRADUATE COURSE.

TUESDAY, April 13th.—4.15 P.M., Mr. B. J. Rodway: Oral Sepsis especially in Regard to the Interpretation of X Ray Films.

FRIDAY.—4.15 P.M., Dr. W. Dyson: Various Types of Loss of Hair—Permanent and Temporary.

Appointments.

DEVINE, H., M.D. Lond. and Bristol, has been appointed Medical Superintendent of Holloway Sanatorium, Virginia Water.

GILCHRIST, S. H., M.B., Ch.B. Liverp., Assistant Medical Officer for Maternity and Child Welfare under Hull Corporation.

HAWKES, SYBIL M., M.B., B.S. Lond., House Surgeon to the New Sussex Hospital for Women and Children, Brighton.

JONES, T. C. L., F.R.C.S. Eng., L.R.C.P. Lond., Honorary Consulting Surgeon to the Royal Infirmary, Liverpool.

PIRRIE, R. R., M.D., B.S. Durh., Visiting Medical Officer, Eastbourne Infirmary, vice Dr. J. Adams, resigned.

Certifying Surgeons under the Factory and Workshop Acts: MAYHEW, E. H., M.D., B.Ch. Camb. (Plymouth); FLORY, C. H., L.R.C.P. Lond., M.R.C.S. (Craven Arms, Salop); HAMBER, J. F., L.R.C.P. Lond., M.R.C.S. (Fordingbridge); ROBERTS, A. M. M., M.B., B.S. Lond. (Caerleon); SHEARER, J. H., M.B., B.Ch. Glasg. (Strathaven); THOMAS, W., L.R.C.P. Lond., M.R.C.S. (Conway); CHRISTIE, G. S., M.B., Ch.B. Aberd. (Wartle, Aberdeen).

Vacancies.

For further information refer to the advertisement columns.

Alton, Lord Mayor Treloar Cripples' Hospital—Asst. Res. M.O. £300.
Bethlem Hospital, Lambeth-road, S.E.—Res. H.P. £25 per quarter.
Birkenhead Education Committee.—Asst. M.O. £600.
Birmingham General Hospital.—Res. Surg. O. £180.
Birmingham, Queen's Hospital.—Med. Reg. £100.
Birmingham University.—Lecturer in Dis. of Ear, Nose and Throat and Lecturer in Orthopaedic Surg.
Blackburn and East Lancashire Royal Infirmary.—Third H.S. £150.
Bradford Royal Infirmary.—H.S. and H.P. Each £150.
Carshalton, Surrey, Queen Mary's Hospital for Children.—Asst. Bacteriologist. £600.
Central London Throat, Nose and Ear Hospital, Gray's Inn-road, W.C.—Asst. O.P. Registrar.
Coventry and Warwickshire Hospital, Coventry.—Res. H.P. £125.
Darlington Union.—M.O. and Public Vaccinator. £500.
Doncaster Royal Infirmary and Dispensary.—Third H.S. At rate of £150.
Downs Hospital for Children, Sutton.—Asst. M.O. £500.
Dudley, Guest Hospital and Eye Infirmary.—Asst. H.S. £150.
Eastbourne, Princess Alice Memorial Hospital.—Res. H.S. At rate of £175.
East London Hospital for Children.—H.P. and Cas. O. Each £125.
Exminster, Devon Mental Hospital.—Jun. M.O. £300.
Fareham, Hants, Knowle Mental Hospital.—Jun. M.O. £350.
Hospital for Consumption and Diseases of the Chest, Brompton, S.W.—H.P. for six months. £50.
Hull Royal Infirmary.—Cas. H.S. At rate of £130.
Ipswich, East Suffolk and Ipswich Hospital.—Res. M.O. £300.
Leicestershire County Council.—Asst. Tuberculosis M.O. £600.
London Homœopathic Hospital, Great Ormond-street, W.C.—P. for Dis. of Skin.
Manchester, Ancoats Hospital.—Res. Surg. O. £200.
Metropolitan Hospital, Kingsland-road, E.—Sen. H.P. and H.S., Jun. H.P. and H.S., and two Cas. O.'s. Each at rate of £100.
Miller General Hospital for South-East London.—Asst. in Out-patients' Dept. £150.
Nottingham, Children's Hospital.—Res. H.S. At rate of £150.
Plymouth, Royal Eye Infirmary.—Hon. P.
Portsmouth Borough Mental Hospital.—Med. Supt. £1100.
Richmond Royal Hospital.—Asst. H.S. £100.
Rochester, St. Bartholomew's Hospital.—Third Res. M.O. At rate of £200.
Royal Free Hospital, Gray's Inn-road, W.C.—Gynæcologist.
Royal Northern Hospital, Holloway, N.—H.P. and H.S. Each at rate of £70.
Stoke-on-Trent, City Education Committee.—School Dentist. £500
Tonbridge Union Institution, Pembury, near Tunbridge Wells.—Asst. M.O. £300.
Truro, Royal Cornwall Infirmary.—H.S. £170.
University of London.—University Chair of Physiology at St. Bartholomew's Hospital Med. Coll. £1000.
Wells, Somerset, Mental Hospital.—Asst. M.O. £300.
York City Mental Hospital, Fulford, York.—Asst. M.O. £440.

The Chief Inspector of Factories announces vacancies for Certifying Factory Surgeons at Petworth (Sussex), Swanage (Dorset), and at Upton (Worcester).

Births, Marriages, and Deaths.

BIRTHS.

BATES.—On March 30th, at Welbeck-street, the wife of Dr. Kenneth Bates, of St. Albans, of a daughter.
FOLEY.—On March 30th, at Ebury-street, S.W., the wife of Walter Foley, F.R.C.S., of a daughter.
WILSON.—At Jhelum, India, on March 7th, to Dagmar Curjel Wilson, M.D. Glasg., D.P.H. Camb., wife of W. R. Wilson, Indian Civil Service, a son.

MARRIAGES.

STOCKTON—ROWNTREE.—On March 31st, at the Friends' Meeting House, Hampstead, Edward Latham Stockton, to Alysoun Hurndall Rowntree, M.R.C.S., L.R.C.P.

DEATHS.

ALSTON.—On March 28th, at St. Thomas's Hospital, of septicæmia, Ronald Bruce Alston, M.R.C.S., L.R.C.P., aged 22.
BIGG.—On Easter Day, at Morpeth-mansions, S.W., George Sherman Bigg, F.R.C.S. Edin. (late Capt.-Surgeon, R.A.M.C.).
HAWORTH.—On March 13th, at Salisbury, Rhodesia, as the result of an accident, Wallace E. Haworth, M.B., C.M., B.Sc., Entomologist to the Administration of Southern Rhodesia at Salisbury.
MCLUSKIE.—On Palm Sunday, following an operation, Peter McLuskie, M.B., Ch.B., D.P.M., aged 33 years.
PRONGER.—On Good Friday, at Litchdon, Harrogate, Charles Ernest Pronger, F.R.C.S. Eng.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

SOME CURIOSITIES OF CLINICAL MEDICINE.

BY C. E. SHELLY, M.D. CAMB., M.R.C.P. LOND.

I.

EVERYONE in the course of medical practice has had experiences where the development of a case or the application of a treatment has had what I may call its curious side. Either some apparently unrelated circumstances fall into the picture or some therapeutic measure has an unusually valuable result, and such experiences are made more useful if it is possible to show that we have in them illustrations of cause and effect along scientific lines. Explanations of the phenomena, as they turn up in the course of practice, are not always possible at the time, but I feel that records should be made because a solution of what was puzzling may afterwards result from observation of similar happenings, while, if they are published, others, with the facts before them, may be able to supply the reasons. "Given a fact, find the explanation of it. But, is it a fact?" said Lauder Brunton.

The word "curiosity" is used in this connexion—not in its more modern sense of something rare, strange, even bizarre, but with more conformity to its original meaning, as indicating some deviation from the normal which arrests attention, calls for "careful" investigation, and demands, if possible, a satisfactory explanation.

POST-INFLUENZAL DIABETES.

I suppose that few of us, after a patient has apparently completely recovered from an attack of influenza, continue to go on testing his urine.

Some 20 years since a lady who had suffered, not severely, from an attack of influenza rather more than three months previously, sought advice on account of feeling "weak and run down," as she expressed it. Examination showed, inter alia, a urine of high specific gravity, containing an appreciable amount of sugar. She did not complain of thirst, although admitting that she was rather more thirsty than usual—attributing this to the hot weather. There did not appear to be any obvious cause for the glycosuria; but I remembered that the particular epidemic of influenza in which she was a sufferer was generally characterised by rather marked gastro-intestinal symptoms. Neither she nor any of the other cases had, however, developed any trace of glycosuria during the illness, nor during the period of what appeared to be a complete convalescence.

But I made occasion for examining a specimen of the day's urine now being passed by each of the influenza patients who had then passed through my hands. Sugar, in varying amount, was found in nine cases. Five of these were cured, and have remained well ever since. Two—an old gentleman and an old lady, both in feeble health—died within three and nine months respectively. Of the remaining two—who had left the neighbourhood in apparently good health—one died within a year, and the other, after some temporary improvement at the beginning of the third year, of true *diabetes mellitus*.

The inference would seem to be that influenza, especially if of the "gastro-intestinal" type, is apt to be followed by the development of diabetes, although this may not declare itself for several weeks after an apparently complete recovery of the initial malady; and that a full examination of the urine is called for in every such case at intervals, for some weeks at least after all influenzal symptoms have subsided, however well the patient may then seem to be. I have found sugar in the urine of five such patients thus examined; all made a good recovery.

There is, of course, nothing surprising in the pancreas becoming functionally affected in the course of a gastro-intestinal inflammation; either directly owing to its invasion by the specific organism or by the extension of an inflammatory process from the duodenum viâ the pancreatic duct. In none of the fatal cases mentioned was a post-mortem examination obtained.

CHLOROFORM AND THE DIPHTHERIA CARRIER.

There are few cases more exasperating to all concerned than that provided by the diphtheria carrier.

An instance of this came under my care some years ago. A schoolboy of about 13, who had made a good recovery from a mild attack of diphtheria, and who appeared to be in buoyant good health, but whose swabs from the right nostril continued regularly to furnish evidence of a local, virulent, and persistent culture of K.L. bacilli. No treatment had proved of any service. Schoolmasters, parents, and doctors were all naturally and seriously chagrined;

and the lad himself had long become weary of his enforced ostracism. Fortunately for him it was summer-time and bright summer weather.

One viewed the details of the local infection as representing an inaccessible rocky fastness to which a band of practised marauders had retreated with their flocks and herds, and in which they seemed able to maintain themselves in comfort indefinitely. Their natural fortress was encircled by a zone of gendarmes (active leucocytes), who could make no direct attack and whose activity was limited to maintaining an ineffective siege. For the space between the two opposing forces was a sort of no-man's-land, which none could attempt to cross without certain death. The only method of destroying the marauders seemed to be by the discharge of poison-gas bombs from aeroplanes or airships flying above them.

About this time the value of small doses of chloroform per os as an effective treatment of the typhoid carrier was being vaunted; and it struck me that this might prove no less serviceable in relation to the diphtheria bacillus. I was the more encouraged in this view by recalling the relative action of ether and of chloroform upon much higher forms of vegetable life. If ethyl ether be injected beneath the bark, into the cambium layer, of a fruit tree, for example, the result is a stimulating one; efflorescence is earlier and more profuse, fruit and foliage are more abundant—the whole life of the tree is activated. But if chloroform be used in the same way the result is, as it were, to send the tree to sleep—blossom appears late, small in amount and feeble in vitality; fruitage is poor, alike in amount, size, and quality; the whole tree is enfeebled.

One might reasonably imagine that, in the course of its evolution, the diphtheria bacillus would have had no opportunity of developing a special immunity to chloroform. It was possible that the guardian leucocytes might at the same time be relatively enfeebled, perhaps even destroyed, by the anæsthetic. But this would be of no importance, if only the virulent bacilli were simultaneously extirpated. In any case, the experiment seemed worth a trial and it could do no harm.

The patient had for some weeks previously been using an alkaline disinfectant spray and douche for nose and throat three or four times daily. This was ordered to be continued as before, save that it was to be made up with chloroform water as the excipient in place of distilled water. At the end of five days all local treatment was discontinued for 48 hours, and swabs were then taken from nose and throat. They were reported to contain no K.L.B. or similar organism. At the end of a second and of a third week, the report was the same. After a resumption of the treatment for three days no treatment was given for a week; swabs taken at the end of that period were also negative. No further treatment was given for yet another week; and then, as the report was again negative, the lad was restored to his normal position in society, without anyone being the worse.

I have since had opportunities of treating a few similar cases with equally happy results. And, though such a record can hardly be claimed as settling the matter for good and all, it would seem to justify the use of such treatment in any similar case; and, also, I venture to think, the use of like measures from the beginning of every case of diphtheria, whether its nature be established or only suspected.

How the chloroform acts, whether, like mercuric chloride, it combines with the chitinous envelope of the microbe and so stiffens this as to render any change of form impossible, or whether it asphyxiates the aerobic organism outright, I do not know. In either case, a bacterium which is made absolutely immobile can neither feed nor subdivide, and therefore such a bacterium can neither grow nor propagate its race; it dies—which is the result at which we aim.

A UNIQUE CASE OF REVACCINATION.

On a certain Tuesday more than 20 years ago a Miss C. wrote to me asking to be revaccinated on the following Thursday. She was at that time running a small creche in the East End of London and spent several days of each week in actively superintending its management. A small epidemic of small-pox had recently broken out in the neighbourhood and she explained that her mother was extremely anxious that she should be revaccinated.

The daughter regarded this as quite unnecessary; she had undergone revaccination five years previously, without its "taking." She herself was assured that she was still immune, and she very much resented having to keep one of her arms in a sling, debarred from active use, even if only for the three or four days which might be requisite before it could be ascertained whether the revaccination were successful or not. Still, in deference to her mother's entreaties, she had, most reluctantly, consented. She was vaccinated on the Thursday morning with fresh lymph of proved efficiency and was told that a revaccination often followed a course less regular than that of a primary vaccination, and that the usual signs of a reaction might be relatively delayed. She was seen on the morning of the fourth day, when there was not the faintest sign of reaction; and at the end of the full week she wrote to me saying that her arm was still quite free from the slightest irritation of any kind. We therefore concluded that the immunity conferred by earlier vaccinations was probably fully maintained, and she resumed her visits to town.

About a week later she wrote again; the local epidemic was spreading; her mother was still dissatisfied, urging that the operation should be repeated; and the daughter had again acceded to the mother's continued pleadings. Of course, it was all nonsense, she wrote, and quite unnecessary; while admitting that at times she was almost prompted to wish that the second attempt might prove successful, and the whole business be got over for good and all—even at the price of having to put the arm out of commission for ten days or a fortnight. This second attempt was fixed for the morning of what was the sixteenth day after the first.

I found the mother sitting at a work-table, engaged on some embroidery, the daughter standing beside her. All that I needed in the way of hot water, clean towels, and soap, were ready at hand. I asked the daughter to remove her bodice, and while she was doing so made the necessary preparations. As I was about to break off the end of a tube of lymph I stopped; then I looked at Miss C. and caught her glance; then I looked at her bared arm again without speaking. She looked at her arm, turned slightly, so as to hide that shoulder from her mother, and said quietly: "Mother, do you remember my coming into your room this morning?" "Yes," was the reply. "You came into my room after your bath and finished your dressing there. Why do you ask?" "Do you remember what you said to me while I was dressing?" asked Miss C. "Yes. I looked at your arm and said, 'Well, you've got nothing there to show your doctor this morning when he comes.'" "Well then, look now," turning so that her mother could obtain a full view of the left arm and shoulder. The site of the vaccination performed a full sixteen days previously was now occupied by a pustule more than half an inch square (two of the three scarifications had coalesced), presenting an appearance in accordance with the date, a fully-formed pustule, beginning to darken and crust around its margins. Its further development, with ultimate separation of the dried-up pustule from the usual foveate scar, was quite normal.

The only explanation of this unusual sequence of events, the prolonged stage of non-reaction, followed by the sudden appearance of a full-blown pustule, which must have visually developed within not less than three and a half hours at the most, and possibly within a much shorter time, is that furnished by self-suggestion. Miss C. was a very capable, accomplished, and level-headed young woman of about 23, descended from a hard-headed Yorkshire stock, possessing great determination, and without a trace of hysteria or other nervous weakness in her individuality. In the first instance she was most strongly opposed to the suggested vaccination; it was, she thought, unnecessary and certain to be unsuccessful; if it were performed without its "taking" she would be the sooner free to resume the work n which she was so deeply interested; therefore it should not occur. This her subliminal consciousness accepted as a mandate that it *must not* occur, at least, must not "take"—i.e., give any visible sign of its having taken. And here we perceive an action similar to that of blushing, which reddens such portions of the skin as are visible to others. In this case it was the outward and visible sign of the vaccination's having "taken" that was chiefly in the mind of the patient, since it was on the presence or absence of such obvious evidence that the limitation or the freedom of movement allowed to the limb would actually depend. Therefore, no local evidence made its appearance; it was indefinitely deferred. But as soon as she again changed her mind, in deference to her mother's wishes for a second revaccination, the position became reversed. Her mental attitude was now somewhat like this: "Oh, for heaven's sake, let me have this revaccination done and let it take, if possible, so that the matter may be settled once for all and there may be no excuse for its repetition." Whereupon, the subconscious ban was not only removed, but all her mental energy, both conscious and subconscious, was directed towards achieving a speedy and complete visible evidence of effective inoculation.

There is at least some reason for assuming that the time of the appearance of this external evidence of successful vaccination coincided very closely with that of my inspection of the arm. For one thing, it is unlikely that it could have made its appearance much earlier without attracting the patient's own attention to the part, as by some unusual local irritation caused by friction of the clothing, or the like. And we have abundant evidence founded on numerous instances in which most serious inflammatory lesions of the surface of the body, even actual gangrene of the part, have instantaneously developed in individuals who had been

"shocked" by suddenly seeing similar lesions, affecting the same part of the body, in another.

Further consideration of this case suggests some interesting problems:—

1. Was the patient in any degree protected against variola during the period for which the superficial evidence of a successful vaccination was lacking? This can hardly be answered off-hand one way or the other. In the first place we know that the vaccinial fluid is not absorbed by the sound, unbroken skin. No one, so far as I know, has succeeded in producing a vaccine vesicle by rubbing the vaccine of cow-pox into the sound, healthy skin. To effect this the superficial (dead) cells of the epidermal layer must first either be removed by friction, or cut or scratched through, so that the active vaccine may be absorbed by the living cells of the corium beneath; such cells exist in the corium and also, to a relatively small extent, in the deepest layer of the true epidermis.

Now, in Miss C.'s case, the corium was reached at the first revaccination; there was bleeding, though very slight, from each of the three scarifications; and there is evidence that the vaccine subsequently rubbed in was absorbed by it. The slight scarification wounds speedily closed and healed—i.e., the area of inoculated corium became covered by a thin layer of apparently unbroken epithelium, as happens in the case of any ordinary, unpoisoned superficial scratch—hiding from view the activities or potential activities imprisoned beneath that small area. Further, we know that in the course of the following 15 or 16 days the small patch of infected ("vaccinated") corium passed through the usual developments, resulting in its being revealed at the end of that time as a well-developed vaccine pustule bearing an appearance corresponding to its age.

But why did not this pustule show up on the surface of the skin before this date? This delay, I think we must agree, was due to the restraining influence of the "subliminal ban." And I incline to think the ban acted by way of a powerful stimulation upon the energies of the protective phagocytes present in the most superficial layer of the corium and in the deeper part of the epithelium, into which it imperceptibly merges. We must remember that what the patient's mind was now concerned with was the ocular evidence—the outward and visible sign—of a successful vaccination; at the beginning she had laid a ban upon the production of such evidence; whereupon there was "whipped up," as it were, a powerful array of white blood-cells whose number and energy did suffice to prevent the virus finding its way to the surface of the skin. Later on this ban was removed and, with its removal, the local force of defensive leucocytes was disbanded, and there then remained no obstacle to the evidence of vaccinial suppuration promptly reaching the surface.

It is only reasonable to suppose that meanwhile, beginning almost immediately after the performance of the vaccination, the vaccinial virus had been actively modifying the vital qualities of the living tissues in its neighbourhood; the results of such action would be carried throughout the body by blood and lymph streams producing the usual effects. And one can discover no good reason why this action should be any the less effective in immunising the patient against variola, simply because the mere superficial tokens of its activity happen to have been temporarily delayed.

2. What would have occurred if the mother had not pleaded for a second revaccination, and if both she and her daughter had been content with the, apparently, ineffective first revaccination? The patient would have been content with this issue of events. She would cease to worry any more about the subject. Her thoughts, once more diverted into their ordinary channels, would no longer be keeping the subconscious self up to its work; it would consequently relax its efforts, and sooner or later would abandon them altogether. Thus the ban would be removed and the external ocular evidence of successful vaccination, a ripe, matured pustule, would suddenly make its appearance. If this occurred during a dance or a dinner party it would have been a portent as disquieting, not to say alarming, as it would be incomprehensible to the spectators and to the victim. But if this removal or extinction of the ban did not occur until some full three weeks or more after the date of vaccination we should not expect any cutaneous sign. Such a period would cover the whole time required for the full development, maturation, and disappearance of the vaccine pustule, and its last disintegrated remnants would have been removed subcutaneously. The patient would have been noted as "unsuccessfully revaccinated."

I was able, soon after the events just narrated, to carry out some experiments on the psychological aspect of vaccination. Adolescence is a period of rapid metabolism. The public schoolboy on his entrance, at about 13 years of age, is almost invariably susceptible to revaccination, and at the termination of his school career the percentage of successful revaccinations is not less than 98 to 99. Seventeen of such lads presented themselves for revaccination under the Army entrance regulations. Their ages varied from 17 to 18·5 years. They were divided into three groups: A, numbering 5; B, numbering 5; and C, numbering 7. Each group was vaccinated separately. Those in Group A were told that some evidence of the lymph having "taken" would be visible by the second or third day. B were told that such evidence would not appear before the evening of the fifth or on the sixth day. To Group C nothing was said. The same stock of lymph was used for all.

In the members of Group A reaction occurred on the evening of the second day in two cases; during the night or early morning, in three cases. In Group B the results were: evening of the fifth day, two; during the same night, two; morning of sixth day, one. In Group C the first evidence appeared: by evening of third day, one; during the following night, one; on the fourth and fifth days, three and two respectively. On two subsequent occasions, with a total of 11 and 9 respectively, who were separately told to expect results on the second and on the fifth day, the discrepancy was rather more marked. In the larger group (of 11) there was one complete failure—he had been revaccinated two years previously.

The late Sir George Paget believed that every convalescent from typhoid fever was fully susceptible to revaccination, even though he might have undergone a successful vaccination just before his attack of typhoid. I do not know whether other observers have made similar investigations. But the point might be worth bearing in mind in relation to every patient recovering from typhoid.

The sudden eruption of the fully-formed vaccinia pustule, as recorded in the case of Miss C., recalls the story of Gehazi. It would not be unreasonable, and it would not involve less of a "miracle," to imagine that Gehazi might have already contracted leprosy during his service with his master, Elisha, although any definite outward manifestations of the disease had not as yet become apparent; and that, stricken with sudden terror and remorse by the prophet's malediction, completely unmanned and acutely visualising his appalling doom, the external evidences of the malady immediately developed, so that he fled from Elisha's presence "a leper as white as snow."

(To be continued.)

THE SCANDAL OF THE SCALES.

To the Editor of THE LANCET.

SIR,—A convalescent was recently weighed on four scales in different chemists' shops in Brighton, and during the same half hour. In no two cases was the weight recorded the same. Another was weighed on two scales in different branches of the same cash chemists, whose watchword is, like all other chemists', prescriptive accuracy; the results were again different. To-day, within a quarter of an hour, I have been weighed on the scales of five chemists' shops in Chatham; in every case the recorded weight is different. I enclose the weight certificates which were given to me and which show the variations. During the past two years I have had occasion to be weighed in many towns in the south of England, and everywhere I have found the same inaccuracy. Is it because the chemists themselves receive no payment for the operation—as this is usually given to the local hospital—that the scales are allowed to be everywhere so scandalously out of order? Why do the inspectors of weights and measures omit to test them, especially as the results recorded mean so much to the health and spirits of the patients?

I am, Sir, yours faithfully,

(REV.) JOHN G. MORTON.

St. Andrew's Presbyterian Church, Chatham.

*** The five weight certificates, which all bear the same date, read 13 st. 3 lb., 13 st. 3 lb. 12 oz., 13 st. 4 lb., 13 st. 4 lb. 8 oz., and 13 st. 5 lb., the maximum variation being 1·08 per cent. of the total weight.—ED. L.

STANDARDISED ANALYTICAL REAGENTS.

THE British Drug Houses have followed the example set by other similar firms in producing in book form [1] the various tests of purity in connexion with their series of analytical reagents. The volume is of the familiar type, and it describes tests on the 88 substances included in every analytical reagent list. The work has been thoroughly undertaken, and the result is a most useful volume. In addition to the information usually contained in such books, the compilers have included methods for the estimation of the majority of the substances. The value of the book is considerably enhanced by a list of reagent solutions and also by a very full index.

[1] B.D.H. Book of Analytical Reagent Standards. London: British Drug Houses, Ltd. 1926. Pp. 111. 2*s.* 6*d.*